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Contents

August 15, 1952
Vol. 18, No. 2

Chemicals and Allied Products 37
Drugs and Pharmaceuticals 37
Agricultural Chemicals 37
Plastics and Plasticizers 37
Miscellaneous Chemicals 38
Electrical Machinery 42
Communication Equipment 42
Electronics 43
Miscellaneous 45
Food and Kindred Products 45
Fuels and Lubricants 45
Instruments 46
Machinery 48
Medical Research and Practice 48
Metals and Metal Products 50
Meteorology and Climatology 51
Minerals and Mineral Products 52
Photographic and Optical Goods 53
Physics 53
General 53
Nuclear 54
Structural Engineering 54
Textiles and Textile Products 55
Transportation Equipment 56
Aeronautics 56
Aircraft 56
Instruments 58
Engines and Propellers 59
Maintenance and Repair 60
Training and Training Devices 61
Aerodynamics 62
Water Supply, Sanitation 64
Miscellaneous 64

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UNITED STATES DEPARTMENT OF COMMERCE

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Chemicals and Allied Products

Drugs and Pharmaceuticals

FUNGISTATIC ACTION OF ANTIHISTAMINIC AND ANTICHOLINERGIC COMPOUNDS, by Roland B. Mitchell, Anna C. Arnold, and Herman I. Chinn. U.S. Air Force. School of Aviation Medicine, Randolph Field, Texas. April 1952. 9p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107090

A total of 33 compounds were tested against Trichophyton mentagrophytes, Trichophyton species (Klein), Microsporum canis, Microsporum gypseum, Monosporium apiospermum, Phialophora verrucosa, Sporotrichum Schenckii, and Candida albicans. Their relative effectiveness against each fungus is tabulated. The fungistatic potency of the preparations did not depend upon their antihistaminic or anticholinergic activities. The effect of slight variations in chemical structure was studied and discussed. Chlorination increased the fungistatic activity, as did the substitution of a cyclohexane group for benzene and benzene, in turn, for pyridine. All phenothiazine derivatives tested were good fungistatic agents. AAF SAM Proj. 21-32-034. Report no. 1.

Agricultural Chemicals

CONTROL OF INSECTS AFFECTING MAN AND HIS HABITATIONS, A LITERATURE SURVEY PREPARED by Francis D. Horigan. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Laboratories. Technical Library. Nov 1951. 62p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $1.75. PB 106653

The advent of the use of DDT as an insecticide in 1944 had a sharp impact on the content and method of developing insect control. So it is this date that the author has chosen as the beginning point for this literature survey covering the subject of insects that carry diseases to man and methods for their control. With few exceptions, the scope of the survey covers the years 1944-1951. An evaluation of the most important insecticides is given. The arrangement of this bibliography is by subject. Since there is considerable crossing of lines in the content of the subjects covered, cross references have been inserted under each caption. Within each subject grouping, the abstracts are arranged alphabetically by author. A name index is appended. QMC. TL BS 20.

SUPERPHOSPHATE AND COMPOUND FERTILIZERS. REPORT OF A VISIT TO THE U. S. A. IN 1949 OF A PRODUCTIVITY TEAM REPRESENTING THE FERTILIZER INDUSTRY. Anglo-American Council on Productivity. Jul 1950. 81p photos, map, drawings, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.75. PB 106442

1. Fertilizers and manures - Manufacture.

Plastics and Plasticizers

CHARACTERIZATION OF MONOCHLOROTRIFLUOROETHYLENE POLYMERS. FINAL REPORT U.S. NAVY CONTRACT NOBSR-42427, INDEX NO. NE-110526. Union Carbide and Carbon Corporation. Bakelite Division, New York, N. Y. Dec 1950. 79p photos, graph (1 fold) tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 106996

Investigations conducted to characterize the nature of monochlorotrifluoroethylene polymers (fluorothene) with particular reference to their usefulness as wire coating and molding materials. These polymers are of interest because of their softening temperature, resistance to burning, chemical inertness, weathering and moisture resistance, electrical characteristics and their good low temperature properties. Based on one or more of these properties, fluorothene appears to fill many needs not currently met by other thermoplastic materials. While fluorothene is flexible in thin sections, it reveals properties more like those of a rigid than an elastomeric material in many respects and should be classified as such. Plasticization with low molecular weight fluorothene polymers increases flexibility in the room and elevated temperature ranges, but the low order of compatibility of such materials and the attendant increase in cold flow appears to limit the advantages gained by plasticization to very specific applications. Of greater significance is the fact that its modulus of elasticity or stiffness increases only gradually over a very wide temperature range. This results in a material which does not shatter readily at temperature as low as -200 deg. C. and which resists flow under low to moderate loads at temperatures as high as +200 deg. C. The outstanding electrical resistivity under conditions of high temperature, high humidity, and in contact with corrosive chemicals, makes fluorothene of extreme interest for wire insulation and other electrical insulating applications. While the polar nature of the molecule results in dielectric loss characteristics unsuitable for the insulation of ultra-high frequency transmission lines, other low and high radio frequency insulating applications are not excluded. Fabrication of these resins by extrusion and molding were studied in considerable detail. While special types of materials are required in the construction of certain parts of the machines, it is important to note that the fabrication of these materials does not require equipment which is highly specialized or radically different from that commonly employed in the extrusion and molding of other plastics. Best wire coating results are obtained by a draw-down technique in which an oversize tube is extruded and pulled down onto the wire as it leaves the machine. The degree of embrittlement occurring at elevated temperatures increases with the amount of viscosity breakdown during extrusion.

FIBERGLAS REINFORCED PLASTIC PRESSURE AND FUEL VESSELS FOR FLAME THROWERS, by Milton A. Raun. U. S. Chemical Corps. Chemical and Radiological Laboratories. Radiological Division, Army Chemical Center, Md. May 1952. 14p photos, drawing Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107008

1. Flame throwers, Portable - Pressure vessels 2. Fuels, Flame thrower - Pressure vessels 3. Fiberglas - Thermal properties 4. Resins - Esters 5. Resins, Polyester - Use to reinforce fiberglas 6. CC CRL IR 147.

CRLIR 147. Project 4-93-13-001. Interim report.

PLEXIGLAS, BEARBEITUNGS-VORSCHRIFTEN (DIRECTIONS FOR MACHINING PLEXIGLAS). Röhm & Haas G.m.b.H., Darmstadt, Ger. n.d. 16p drawings, tables (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 40060

1. Plexiglas - Manufacture - Germany.

REPORT NO. 21 TO THE ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES, CONTRACT NO. W44-009 ENG-587, by P. E. Meiss and R. L. Knarr. Thiokol Corp., Trenton, N. J. Aug 1950. 44p. graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.50, Photostat $6.25. PB 106990

Further work on pentamethylene dichloro and dibromide polymers is reported and second order transition points are given for a series of pentamethylene/formal copolymers. A series of copolymers of formal with hexamethylene dibromide have excellent low temperature flexibility that appears to be independent of the rank of the polymer. Decamethylene dibromide/formal copolymers are also reported. Further work on copolymers of 2,3-dichloropropyl caprylate with formal corroborated previous results. Preliminary work is reported on three different methods of approach to the problem of combining "Thiokol" type polymers with polybutadiene. The application of the torsion modulus test to creep measurements is reported in detail; and the application of these measurements to comparisions of low temperature flexibility of different types of polymers is demonstrated. Project no. 8-93-15-001. Includes appendices Q-T.

Miscellaneous Chemicals

A COLLECTION OF CHEMICAL REPORTS. Deutsche Gold & Silberscheideanstalt, Frankfurt am Main, Germany. 1935-1943. 927f Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Enlargement Print $117.50. PB 74423

This FIAT microfilm reel contains reports and correspondence concerning the production and use of peroxides, carbon blacks, cyanides, and various other chemicals. Individual reports, available as enlargement prints, are listed below. Please give PB and frame numbers when ordering individual items. These reports are in German except a few in English so marked below.

Frames	Title	Price
7486-7520	Continuous production of methyl formate from methanol and carbon monoxide. 1943. In German.	$6.25
7521-7529	Catalytic dissociation of hydrogen peroxide by various metals. 1943. In German.	$2.50
7530-7533	Determination of the solubility of nickel in silver by measuring the micro-hardness. 1943. In German.	$2.50
7534-7539	The structure of the partial system Al-$PdAl_3$. 1943. In German.	$2.50
7540-7543	Production of magnesium silicofluoride. 1943. In German.	$2.50
7544-7546	Experiments for producing zirconium by electrolysis in the molten state. 1943. In German.	$2.50
7547-7557	Activation (of carbon) by means of steam. 1943. In German.	$2.50
7558-7570	Production and use of mixed acetic and nitric acid esters of pentacrythrite. 1943. In German.	$3.75
7571-7597	Cracking of oil in the electric arc. 1937. In German.	$5.00
7598-7605	Comparison of the formaldehyde productions of Wildan and Mombach. 1940. In German.	$2.50
7606-7609	Price calculations of acetone and "Plexiglas." 1939. In German.	$2.50
7610-7615	Bactericidal properties of "Simanit" and "Argozyt." 1939. In German.	$2.50
7616-7624	Elimination of catalysts in peroxide bleaching. 1942. In German.	$2.50
7625-7687	Washing and bleaching with wash liquors containing active oxygen. 1942. In German.	$10.00
7688-7699	Experiments for reducing the consumption of hydrogen peroxide in the ripening of cellulose with hydrogen peroxide and alkali. 1942. In German.	$2.50
7700-7711	The pH range of stabilizers for peroxide bleaching baths. 1941. In German.	$2.50
7712-7725	The use of sodium chlorite-formaldehyde solutions. 1943. In German.	$3.75
7726-7747	Fiber protection by addition of anticatalytic agents. 1943. In German.	$5.00

Frames	Title	Price
7748-7758	Washing tests with sodium chlorite. n.d. In German.	$3.75
7759-7761	Synthetic fiber bleaching tests. 1943. In German. Not well legible.	$2.50
7762-7764	The problem of deodorizing synthetic fatty acids. 1943. In German.	$2.50
7765-7772	Protective agent to be added to mordants, suitable to be mixed with sodium bisulfate. 1942. In German.	$2.50
7773-7777	Survey of Degussa research concerning the use of hydrogen peroxide in the preliminary ripening of alkali cellulose. 1942. In German.	$2.50
7778-7785	Bleaching tests. 1942. In German.	$2.50
7786-7811	Experiments for developing a method for producing a flocky bast from flax and hemp. 1932. In German. Not very legible.	$5.00
7812-7818	Experiments for reducing the consumption of hydrogen peroxide in ripening cellulose with hydrogen peroxide and alkali. 1942. In German. Not very legible.	$2.50
7819-7826	Production of sodium chlorite from chlorine dioxide and sodium peroxide. 1942. In German.	$2.50
7827-7833	Apparatus for dissolving calcium chloride. 1941. In German. Poorly legible.	$2.50
7834-7848	Progress in cellulose bleaching. n.d. In German. Not very legible.	$3.75
7849-7855	Carbon black classification by grain sizes. 1935. In German.	$2.50
7856-7861	New methods for increasing the yield of carbon black. 1935. In German.	$2.50
7862-7873	Compression of carbon black by the use of a worm press. 1935. In German.	$3.75
7874-7884	Testing oils for possible use in carbon black production. 1935. In German.	$3.75
7885-7886	Report (on conference concerning business problems.) 1935. In German.	$2.50
7887-7893; 7910-7917	Carbon black experiments with use of the open flame. 1936. In German. Parts 1 and 2.	$2.50
7894-7904	The effect of the production method on the quality of "CK3" carbon black. 1936. In German.	$3.75
7905-7909	Changing the shade of concrete with carbon black. 1936. In German.	$2.50
7910-7917	See above frame 7887.	
7918-7934	Carbon blacks for the rubber industry. 1936. In German.	$3.75
7935-7955	Carbon black experiments with use of the open flame. 1936. In German. Parts 3 and 4 not very legible.	$5.00
7956-7961	New methods for increasing the yield of carbon black. 1936. In German.	$2.50
7962-7988	Duplication of 7571-7597 above.	
7989-7998	Second meeting of carbon black technicians. 1939. In German.	$2.50
7999-8001	Report on the inspection of the pneumatic carbon black conveyor system at I. G. Farben A. G., Ludwigshafen. 1939. In German.	$2.50
8002-8003	Letter concerning avoidance of explosions of saltpeter melts. 1937. In German.	$2.50
8004-8005	Letter concerning cyanide slags. 1938. In German.	$2.50
8006-8010	The use of salt melts in various industries, for purposes other than hardening. 1938. In German.	$2.50
8011-8015	Accumulating waste heat and energy peaks in large salt melts, and their recovery. 1938. In German.	$2.50
8016	Letter concerning saltpeter mixtures containing chromates and dichromates. 1937. In German.	$2.50
8017-8019	Charcoal for cementing powders and salt baths. 1937. In German.	$2.50

Frames	Title	Price
8020-8023	File note concerning electric melting of mixture of sodium barium and calcium chlorides. 1937. In German.	$2.50
8024-8028	Hardening process of I. G. Farbenindustrie A. G. 1937. In German.	$2.50
8029-8035	Monthly report of the pilot plant for hardening. 1937. In German.	$2.50
8036-8040	Travel report (concerning chiefly barium and strontium chlorides). 1937. In German.	$2.50
8041-8043	Note (concerning corrosion). 1936. In German.	$2.50
8044-8045	Addition agent for foundries. 1936. In German.	$2.50
8046-8047	Letter from Du Pont on "Durferrit." 1936. In English.	$2.50
8048-8052	Letter in reference to an article in the aluminum magazine (concerning saltpeter explosions). 1936. In German.	$2.50
8053-8054	Composition of "Durferrit" salts. 1935. In German.	$2.50
8055-8060	Description of plants. 1936. In German.	$2.50
8061-8067	Minutes of meeting concern salt bath furnaces. 1936. In German.	$2.50
8068-8072	Partial duplication of preceding item.	
8073-8076	Development of tank furnaces for flow processes in large "Durferrit" hardening plants. 1936. In German.	$2.50
8077-8083	Working program of the pilot plant (for hardening). 1936. In German.	$2.50
8084-8091	Travel report: Development of electric furnaces. 1936. In German.	$2.50
8092-8095	File note on the appeal in the case D 58 877 (concerning patent application for "Durferrit C5"). 1936. In German.	$2.50
8096-8100	Relations with steel plants. Development of steel cylinders and cores. 1936. In German.	$2.50
8101-8103	Letter concerning improvement of electrically heated salt bath furnaces for temperatures up to 950°C. 1936. In German.	$2.50
8104-8105	Note on a visit (concerning salt baths). 1936. In German.	$2.50
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8176-8183	Formation of cyano-compounds in furnaces. 1937. In German. Not very legible.	$2.50
8184-8187	German regulations for the handling of sodium cyanide. 1937. In German.	$2.50
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8229-8231	File note on the demonstration of the process E. Wild by the inventor. (Cyanides). 1936. In German.	$2.50
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8241-8245	Production of cyanamide. 1936. In German.	$2.50
8246-8248	File note on the production of hydrocyanic acid from sodium cyanide. 1935. In German.	$2.50
8249-8251	Production of sodium amide suspensions. (Application for a license). 1940. In German.	$2.50
8252-8257	Process for hydrocyanic acid. 1939. In German.	$2.50
8258-8263	Visit in Villers St. Sépulcre. 1940. In German.	$2.50
8264-8267	Detoxification of residues of the hardening plant which contain sodium cyanate. 1940. In German.	$2.50
8268-8270	Report on experiments for dyeing paper with colloidal Berlin blue. 1940. In German.	$2.50
8271-8274	Sodium cyanate. 1939. In German.	$2.50
8275-8276	Note on travel report (concerning cobalt production). 1939. In German.	$2.50
8277-8281	Cyanide production in Niagara Falls. 1939. In English.	$2.50
8282-8284	Minutes of the meeting of cyanogen technicians. 1939. In German.	$2.50
8285-8287	Attitude towards the American patent application Pc 1856 "Disposal of waste cyanide solutions", By Du Pont de Nemours. 1939. In German.	$2.50
8288-8289	Detoxification of waste liquors containing cyanides. 1939. In German.	$2.50
8290-8291	The degree of accuracy of cyanide analyses. 1938. In German.	$2.50
8292-8295	Production of hydrocyanic acid and sodium cyanide. 1938. In German.	$2.50
8296-8304b	Cyanide plant Niagara Falls. 1938. In German.	$2.50
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8309-8312	Cyanide plant Niagara Falls. 1938. In German. Partial duplication of 8296-8304 except for one page which is missing above.	$2.50
8313-8317	Notes on the Andrusson process. 1938. In German.	$2.50
8318-8331	Experiments for stabilizing hydrogen peroxide with metaphosphate. 1937. In German.	$3.75
8332-8342	Visit in Weissenstein, (chiefly on peroxide production). 1937. In German.	$3.75
8343-8345	Hydrogen peroxide free of sulfuric acid, stabilized with phosphoric acid only. 1937. In German.	$2.50
8346-8357	Visit of the plant Pierre-Bénite of Société d' Electrochimie. 1937. In German.	$3.75

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8377-8378	The use of hydrogen peroxide in the canning industry. 1936. In German.	$2.50
8379	File note on experiments with hydrogen peroxide as addition to nickel baths. 1936. In German.	$2.50
8380-8386	Visit in Weissenstein, (on various aspects of hydrogen peroxide production, stabilization, and handling). 1936. In German.	$2.50
8387-8388	Note on the use of hydrogen peroxide as activator in polymerization reactions. 1936. In German.	$2.50
8389-8393	Hydrogen peroxide plant Rheinfelden. 1936. In German.	$2.50
8394-8410	Experiments for stabilizing hydrogen peroxide. 1936. In German.	$3.75
8411-8412	Letter concerning benzylglycol, cresylglycol, and xylenyl glycol. 1936. In German.	$2.50

REACTIVITY RATIOS OF SOME MONOMER PAIRS, by Howard C. Haas and Myron S. Simon. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 9p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107017

1. Copolymerization - Research.

The majority of this work was carried out under Army Chemical Corps contract no. DA-18-108-cml-689.

SURVEY OF THE SULPHUR AND SULPHURIC ACID POSITION, by R. Ashton, A. L. Thorogood, D. Neville-Jones. Gt. Brit. Dept. of Scientific and Industrial Research. Jun 1952. 27p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107085

1. Sulfur - Production - Gt. Brit. 2. Sulfuric acid - Production - Gt. Brit.

S. O. Code no. 47-169.

Electrical Machinery

Communication Equipment

FLUGZEUGSTATION TYPE SEZ 07535A. (KURZ-LANGWELLENFLUGZEUGFUNKANLAGE) SECHSTE AUFLAGE. (AIRCRAFT WIRELESS EQUIPMENT FOR SHORT AND LONG WAVES, TYPE SEZ 07535A). Lorenz, C. A. G., Berlin. Ed. 6. n.d. 53p fold drawings, tables (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 40050

1. SEZ 07535a (Radio set) 2. Radio equipment - Germany.

RECEIVER NOISE FIGURES AND THEIR MEASUREMENT, by Yardley Beers. Massachusetts Institute of Technology. Radiation Laboratory. May 1945. 31p photos, diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.25, Photostat $5.00. PB 106961

This report is a survey of the methods for the measurement of receiver noise figures. Most of the material has been published previously, but it has seemed desirable to consolidate it in a single report for the benefit of those people who, without previous experience in this field, have to set up and operate equipment to make noise figure measurements on production lines and in the field. The report contains a discussion of the fundamental concepts as well as a description of the experimental techniques. Special emphasis is placed upon the use of noise generators. MIT Rad Lab 746.

REPORT OF THE CANADIAN NATIONAL COMMITTEE OF UNION RADIO SCIENTIFIQUE INTERNATIONALE (U.R.S.I.) FOR 1950-1952, SUBMITTED TO THE XTH GENERAL ASSEMBLY OF U. R. S. I., SYDNEY AUSTRALIA, AUG. 11-22, 1952, BY D.W.R. MCKINLEY, CHAIRMAN, CANADIAN NATIONAL COMMITTEE OF U. R. S. I. National Research Council of Canada. Apr 1952. 28p tables Available from National Research Council of Canada, Ottawa, Canada. $.50. PB 107071

1. Ionospheric measurements 2. Radio astronomy - Research 3. Electronics - Research 4. Radio - Research 5. Atmospherics - Waves 6. Radio waves - Atmospheric effects 7. Radio waves - Propagation - Theory 8. Union Radio Scientifique Internationale. Canadian National Committee 7. NRCC 2733.

Contents: Report of Commission I: Measurements and standardization, by J. T. Henderson. - Report of Commission II: Tropospheric wave propagation (including work on terrestrial atmospherics - Commission IV), by Dr. J. S. Marshall. - Report on terrestrial atmospherics, by T. W. Straker. - Report of Commission III: Inospheric wave propagation, by

J. C. W. Scott. - Report of Commission V: Radio astronomy, R. E. Williamson. - Report of Commission VI: Wave and circuits, by George Sinclair. - Report of Commission VII: Electronics, by P. A. Bricout.

Electronics

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 1 (PERIOD, DEC 15, 1947, TO FEB 14, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-ENG-544. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 27p fold graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107025

The use of high polymers for base materials for the formation of absorbing **units** in situ offers good possibilities for the construction of improved filters possessing high temperature stability, substantial opacity to visible light, and selective filtering action in the infrared. Dehydrated polyvinyl alcohol has excellent spectral characteristics for a band-pass filter transmitting the 1-3 region, but improvement must be made in its mechanical properties. Dehydrohalogenated polyvinylidene chloride has given preliminary results of promise for the preparation of an improved filter material having high optical density in the visible, high thermal stability, good mechanical properties, and displaying selective transmission in the infrared beyond ca. 1 Later reports under this contract are PB 107026-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 2 (PERIOD FEB 15, 1948 TO APR 14, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 32p diagrs, fold graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107026

Discussion of investigational work on absorber-type filters, powder filters, supporting materials and instruments for rapid inspection of filter material and comparative values of energy transmitted at various wavelengths. Report under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 3 (PERIOD APR 15, 1948 TO JUN 15, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by R. S. Corley. Polaroid Corp. Research Dept., Cambridge, Mass. Jul 1948. 33p photo, fold graphs Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $2.25, Photostat $5.00. PB 107027

Discussion of powder filters, C-sheet-powder filters, C-sheet preparation, C-sheet-glass laminations and instrumentation. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 4 (PERIOD JUNE 15, 1948 TO AUG 15, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by R. S. Corley. Polaroid Corp. Research Dept., Cambridge, Mass. Aug 1948. 19p graphs (2 fold), tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107028

Discussion of powder filters, pressed silver sulfide and elimination reactions in polymers. Reports under this contract are PB 107025-107036.

INFRARED TRANSMITTING FILTERS. INTERIM REPORT NO. 5 (PERIOD AUG 15, 1948 TO OCT 15, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by R. S. Corley. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 14p diagrs, graphs (1 fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107029

Discussion of C sheet filters, Christiansen filters and the elimination reactions in polymers. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 6 (PERIOD OCT 15, 1948 TO DEC 14, 1948) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by P. L. Snow. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 16p graphs (2 fold), tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107030

Discussion of C-sheet filters, powder C-sheet filters and polymonochlorotrifluoroethylene and polytetrafluoroethylene filters. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 7 (PERIOD DEC 15, 1948 TO FEB 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 21p graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107031

Discusses the work on the preparation and properties of this two-layer band-pass filter for wavelengths 3 to 6 mm. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 8 (PERIOD FEB 15 TO APR 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 27p graphs, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107032

A survey of the infrared transmission of scattering

layers made by milling particles of metallic oxides of high refractive index into silver chloride begins to show some regularities. Some oxides actually studied such as Fe_2O_3, Cr_2O_3, and Mn_xO_y have relatively wide pass bands; others have narrower pass bands which are either symmetrical on a linear wavelength scale (TiO_2 and NiO), or unsymmetrical so as to give a sharper cut on the longer wavelength side (CuO and Co_xO_y). These narrower bands are presumably Christiansen bands. It appears that metal oxide particles in silver chloride might afford practical pass band filters in the 6 to 15 mu range of wavelengths and higher, and that other scattering filters will be necessary for the 1 to 6 mu range. Reports under This contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 9 (PERIOD APR 15-JUNE 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 12p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107033

We have completed a survey of silver chloride scattering layers and have begun a survey of similar layers made by milling various metallic oxides into polytetrafluoroethylene (Teflon). We include the infrared transmission curves of the resulting scattering filters over the region 1 to 15 mu. Simple and complex oxides of metals in the range ^{3}Li to ^{14}Si exhibit Christiansen transmission peaks in the range 4.5 to 6 mu. while oxides in the range ^{22}Ti to ^{30}Zn show either no interesting peaks, or peaks on the long wavelength side of the strong Teflon absorption at 8.4 mu. In none of these scattering layers are sharp high-pass cutoffs found by the methods employed. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 10 (PERIOD JUNE 15-AUG 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 29p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107034

Contains paper entitled "Comparison of the performance of the Polaroid XRN infrared filters with the performance of ideal filters by R. Clark Jones." Appendix: Comparison of the performance of the Polaroid XRN infrared filters with the performance of ideal filters, by R. Clark Jones. Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. INTERIM REPORT NO. 11 (PERIOD AUG 15-OCT 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 26p graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107035

1. Filters - Materials 2. Filters, Infrared 3. Infrared - Research.

Reports under this contract are PB 107025-107036.

INFRARED-TRANSMITTING FILTERS. FINAL REPORT (PERIOD DEC 15, 1947 THROUGH DEC 14, 1949) UNDER ENGINEER RESEARCH AND DEVELOPMENT LABORATORIES CONTRACT NO. W-44-009-ENG-544, by C. D. West. Polaroid Corp. Research Dept., Cambridge, Mass. n.d. 88p photo, graphs (part fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.75, Photostat $11.25. PB 107036

1. Filters - Materials 2. Filters, Infrared 3. Infrared - Research.

For 1st-11th interim reports see PB 107025-107035.

SOME ASPECTS OF THE PERFORMANCE OF MIXER CRYSTALS, by P. D. Strum. Airborne Instruments Laboratory, Inc., Mineola, N. Y. May 1950. 73p diagrs, graphs, fold tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 107037

This report describes a theoretical and experimental investigation of the performance of microwave mixer crystals. The purpose of the investigation was to develop a simple mathematical theory describing the performance of mixer crystals; to obtain experimental data substantiating the theory; and to reduce the theoretical results to concrete methods for improving and predicting the performance of standard crystals as mixers. A mathematical theory was developed that permits analysis of crystal characteristics with respect to impedances, fundamental and harmonic conversion loss, and harmonic-generation efficiency. Technical memorandum no. 172-TM-3 Contract NOa(s)-8575.

THEORETICAL STUDY, DESIGN AND CONSTRUCTION OF C-W MAGNETRONS FOR FREQUENCY MODULATION. FINAL REPORT, PROJECT M694 FOR CONTRACT NO. W36-039-SC-32245, by H. W. Welch, Jr., J. R. Black, G. R. Brewer, G. Hok. Michigan. University. Engineering Research Institute, Ann Arbor, Michigan. May 1949. 188p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.75, Photostat $23.75. PB 106988

The problem involved in frequency modulation of magnetrons by means of the magnetron type space charge swarm have been investigated. The technique of making impedance measurements on hot magnetrons has been used extensively. Experimental results agree very well with the theoretical analysis. Three frequency modulation magnetron designs have been studied. Preliminary tests have been made on an oscillating model of one of these designs. The results of this development are not complete, but are presented in their present form. A general outline of the procedure used and the facilities of the laboratory are discussed. The principles of tubes, based on the interdigital principle, which might be applicable to magnetron amplifier, signal generators and high power magnetrons, are given brief attention. Complete drawings for one model and assembly drawings

of all tubes designed in this laboratory are given. Technical report no. 3, Electron Tube Laboratory. Dept. of Army project no. 399-13-022. Signal Corps project no. 112B-O.

Miscellaneous

STÖRARMER EMPFANG DURCH ANTENNEN MIT GESCHIRMTER NIEDERFÜHRUNG (INTERFERENCE-FREE RECEIVING ANTENNAS WITH SCREENED FEEDER LINES), by W. Hormuth. Mar 1949. 15p diagrs, graphs (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 106951

An attempt was made to utilize all the available information on shielded transmission lines for the development of a practical, commercial feasible, shileded antenna for use in the long and short wave regions. The phenomena of local and atmospheric interferences, and the matching of the feeder line to the antenna, are discussed. All the components of the experimental antenna system are fully described and installation and checking instructions are given. From Frequenz, zeitschrift für schwingungs-und schwachstromtechnik, bd. 3, nr. 3, Mar 1949, p. 61-73.

Food and Kindred Products

COMPARATIVE BIOLOGICAL, FLUOROMETRIC, AND MICROBIOLOGICAL ASSAYS OF RIBOFLAVIN IN ENRICHED WHEAT FLOUR, AND IN WHOLE WHEAT, by Vidar Hellström. Royal Swedish Academy of Engineering Sciences. 1952. 37p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107110

The report is divided into the following parts: I. Historical Survey, II. Experiments, and III. Discussion. The applicability of biological, fluorometric and microbiological methods for assaying the riboflavin content in enriched flour and in whole wheat has been tested, statistical methods having been employed in elaborating the experimental material. The biological method, fluorometric method 2 and microbiological method 1 gave concordant values in the determination of riboflavin in enriched flour having contents ranging from 2 to 3 g per g. The procedure employed for the determination of riboflavin in whole wheat gave widely different values. The reason for this and for the great discrepancies existing between the values found by various investigators for this material, has been discussed. Work was completed in Aug 1948. Tables and equations are given. A bibliography is attached. Royal Swedish Academy of Engineering Sciences. Handlinger no. 209.

CONSTRUCTION OF REFRIGERATORS AND FREEZERS, by James T. Leggett. Florida. Engineering and Industral Experiment Station, Gainesville, Fla. May 1952. 38p photos, drawings, graphs, tables Available from Florida Engineering and Industrial Experiment Station, Gainesville, Fla. PB 107081

1. Refrigerators - Design 2. Freezers - Design 3. F EES 53.

Engineering progress at the University of Florida, vol. VI, no. 5.

FREEZING AND COLD STORAGE OF HERRINGS, by A. Banks. Gt. Brit. Dept. of Scientific and Industrial Research. Food Investigation Board. 1952. 46p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107118

1. Fish - Refrigeration - Gt. Brit. 2. Fish - Freezing - Gt. Brit. 3. Herring - Freezing - Gt. Brit. 4. Herring - Refrigeration - Gt. Brit. 5. DSIR FI SR 55.

Report is dated Mar. 1951. S. O. Code no. 47-8-55.

WISSENSCHAFTLICHER JAHRESBERICHT 1939/40 UND 1940/41, by Dipl.-Ing. Professor Plock. Versuchs-und Forschungsanstalt für Milchwirtschaft, Kiel, Ger. 1941. 98p drawings Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 107092

1. Dairies and dairying - Germany 2. Milk - Production - Germany.

Fuels and Lubricants

ALTITUDE PERFORMANCE OF GAS TURBINE FUELS OF VARYING VOLATILITY. FINAL REPORT, GROUP ON GAS TURBINE VAPOR LOCK, AVIATION FUELS DIVISION, UNDER CONTRACT NOA(S)10555 AND AMENDMENT 1. REVISED. Coordinating Research Council, Inc., New York, N. Y. Dec 1950. 61p diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 107149

Tests have been completed to explore the variables which influence vapor formation and fuel losses in high-performance gas-turbine-powered aircraft, using a mock-up fuel system which contained typical components that are normally used in such airplanes, These studies included the effect of vapor formation on fuel-pump operation, and evaporation liquid entrainment losses from the tank. The conditions for these were chosen to accentuate differences among fuels within the range covered by present-day aircraft. Included in this investigation were fuels ranging from JP-1 type to the more volatile JP-3 type, as well as aviation gasoline fuel temperatures from 60 to 110 F, rates of climb to 10,000 fpm, terminal altitudes to 60,000 ft, and several different designs of engine and booster pumps. The results of tests to determine the influence of altitude on the air contents of fuels are described in an appendix.

INSTRUCTIONS FOR THE OPERATION AND CARE OF THERMAL DELEADING UNIT. Ethyl Corporation. Chemical Research Laboratory. Jun 1944. 6p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107045

1. Gasoline - Deleading kits - Maintenance and repair.

THERMAL DELEADING OF GASOLINE, by William R. Wilkinson. Ethyl Corporation. Chemical Research Laboratory. Aug 1944. 22p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107044

1. Gasoline - Deleading 2. Gasoline - Deleading kits 3. SIG Contract W28-003-sc-246 4. LTD 44-52.

Contract no. W-28-003-sc-246.

Instruments

COMPARISON OF THREE MULTICYLINDER ICING METERS AND CRITIQUE OF MULTICYLINDER METHOD, by Wallace E. Howell. U. S. National Advisory Committee for Aeronautics. Jun 1952. 40p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107003

Three multicylinder icing meters, fundamentally similar but differing from each other in important design details, were compared in use at the Mount Washington Observatory. Comparison of relative effectiveness of the instruments, evaluation of observational errors, determination of the effects of detailed design differences, and recommendations further improvements of design are presented. An evaluation of the multicylinder method, concerned with the validity of the theoretical basis and the degree to which the instruments and the technique of their use permit accurate determinations of the physical measurements involved, is also included. NACA TN 2708.

DESIGN OF A TRANSISTOR RADIOTELETYPE CONVERTER, by John A. Bush and Gerald S. Epstein. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Mar 1952. 24p drawings, fold diagr, graph Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107046

1. Converters, transistor radioteletype - Design 2. SCEL TM M-1437.

Signal Corps Proj. no. 132A. Dept. of the Army Proj. no. 3-99-12-021.

FINAL REPORT ON HERMETICALLY SEALED HIGH MEGOHM RESISTORS, CONTRACT NO.: DA-36-039-SC-11 FOR THE U. S. SIGNAL CORPS, by the Sprague Electric Company. Sprague Electric Co., North Adams, Mass. Apr 1951. 29p photos, drawings, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107047

This report describes development work conducted in the field of high megohm resistors. Resistors of a new type have been developed, covering the resistance range 10^8 to 10^{15} ohms. After evaluation of a number of systems in which carbon was deposited on or dispersed in an insulator, glass materials having a high lead oxide content were reduced with hydrogen to form a conducting surface on the glass. Process specifications and chemical data were obtained for the full line of high megohm resistors using reduced glass as a resistance element. Two chemically different glasses were used as the raw materials for this work. An improved instrument for resistance measurements was devised and constructed. This was done on a basis of a literature survey and an electrical analysis of the problem. Contents: Appendix A. Resistors, fixed, high megohm. - Appendix B. Literature survey. Work is continued under Contract no. DA36-039-sc-5443.

FINAL REPORT ON RESEARCH CARRIED OUT BY INDIANA UNIVERSITY FOR THE BIOLOGICAL DEPARTMENT, CHEMICAL CORPS, CAMP DETRICK, ON CONTRACT W-18-064-CM-218, 1 SEP 1948-31 AUG 1950, by Frank T. Gucker, Jr. Indiana. University. n.d. 128p drawings, diagrs (part fold) graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 107016

Four separate problems are discussed in separate sections, each section preceded by a table of contents, and each containing equations, illustrations, and references which are numbered consecutively, the last being collected at the end. The investigation of the aerosol particle counter was divided into two parts: (1) experimental work aimed at improving the sensitivity, stability, and usefulness of the apparatus for particle-size measurements, and (2) calculations of theoretical counter response curves for isotropic spheres in various practical optical systems. The experimental work on the counter included construction of a new power supply which reduced 120-cycle ripple and background noise in the instrument; and introduction of a Schmitt-trigger circuit with much greater stability and sensitivity than the thyratron circuit originally used in the differential pulse-amplitude selector. Calculation of the theoretical counter response curves for isotropic spheres involved the derivation of equations applicable to various practical optical systems, taking into account finite aperture of both illuminating and collecting lens, as well as the spectral distribution of the light source and the spectral response curve of the photomultiplier tube. Contents: Abstract. - Aerosol particle counter. - Counder for liquid-dispersed sols. - Mass concentration control and penetrometer. - Sonic determination of particle size. - Appendix: Tabulation of Mie functions.

FIXED COMPOSITION RESISTORS. INTERIM ENGINEERING REPORT, 14TH, PERIOD JUL 28 TO AUG 28, 1947, CONTRACT NO. W33-038-AC-15173, by L. R. Jackson, A. E. Middleton, R. L. Davis, N. L. Haldy, H. Z. Schofield and C. R. Austin. Battelle Memorial Institute, Columbus, Ohio. Aug 1947. 25p tables (3 fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107095

Several parts of the carbon-coating apparatus have been rebuilt and pressure- and vacuum-tight connections built into the construction. Radiation baffles in the ends of the jet chamber and cooling coils soldered on the outside of the ends of the jet chamber have been added. Individual variable power sources have been attached to each of the five furnace elements in the pyrolysis system to provide sufficient wattage input to raise the enlarged jet chamber to the desired temperature. Vacuum pressures of about 200 microns

at operating temperatures can be obtained. Carbon-coated rods which apparently have good circumferential and lengthwise uniformity of thickness and resistance have been produced with the system during preliminary runs. Double and triple coatings of several high-temperature paints applied to carbon-coated resistors appear to suppress oxidation to an extent that it is tentatively believed that, operating temperatures of 200°C.(390°F.) can be achieved with carbon-film resistors. Ceramic base investigations have been extended to titanate and zircon bodies and new methods of burning and handling the bodies such that the minimum amount of contamination of the surface results. The thermal-expansion coefficients of the spark plug body, the low-loss steatite body, and the zircon porcelain body have been measured. Data are given in the report. A brief account of a conference held with several German scientists at Wright Field in regard to bases for carbon-film resistors is also given. For final report see PB 102788. For other Interim reports see PB 103426-PB 103440.

INFRARED SPECTROSCOPY APPLIED TO THE STUDY OF THE SOLVENT EXTRACTION OF INORGANIC IONS, by Stephen Edward Wiberley. May 1950. 130p diagr, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 107098

An infrared study was made of the effect of various proton and deuterium donors and inorganic ions on oxygenated and nitrogen-containing solvents. Quartz, lithium fluoride, and sodium chloride prisms were accurately calibrated for this work. It is shown that as a result of hydrogen bonding the frequencies due to the H-Cl, C-D and O-D vibrations are all shifted to lower values. These shifts do not correlate with any solubility data. However, the shifts of the OD band with a series of amines correlate well with the pK (hydrolysis) constants. The C-O-C vibration in the ethers is also shifted to lower frequencies, by both proton donors and inorganic ions. Various infrared bands due to the presence of inorganic salts have also been assigned to the uranyl, sulfate, and nitrate groups. Thesis-Rensselaer Polytechnic Institute.

INVESTIGATIONS OF THE MEASUREMENT OF NOISE. PROGRESS REPORT NO. 24, JAN 1 TO MAR 31, 1952 UNDER CONTRACT NOBSR 49128, INDEX NE 120803, by A. Eckersley, F. T. Nicholson, F. R. Roberts. Pennsylvania. University. Moore School of Electrical Engineering. Apr 1952. 30p photos, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107104

1. Noise - Measurement 2. Meters, Sound 3. Lamps, Fluorescent - Noise.

Research Division report no. 52-39. For reports no. 1-23 see PB 85974-85981, 110114-110119, 101545-101546, 103055-103057, 105003, 106603-106604.

MAGNETIC OXYGEN METER, by Herr Schultze and Dr. Lieneweg. Siemens & Halske A. G., Wernerwerk, Ger. n.d. 29p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107040t

1. Oxygen, Magnetic - Measurements - Germany 2. Thermal conductivity - Measurements - Germany 3. Wheatstone bridge - Germany 4. Oxygen meters, Magnetic - Germany 5. Gases, Magnetic - Measurements - Germany 6. Senftleben effect (Conductivity of gases) - Germany 7. Micro BIOS DOC 2082/1464/37, translation.

Translated by Frank R. Herron, 10 December 1946. Drawing No. Cal. ktr. 609a is not included with the translation. B.I.O.S./Docs/2082/1464/37, translation. Interim report no. 12/44/5F. Gr. 555/22.

NRC 10.7 - CENTIMETER RADIOTELESCOPE AND RADIOMETER, by A. E. Covington. National Research Council of Canada. Radio and Electrical Engineering Division. May 1952. 26p photos, drawings, diagrs Available from National Research Council of Canada, Ottawa, Canada. $.50. PB 107042

The construction of a radiotelescope (4-foot paradoloidal reflector) and receiver to measure 10.7-centimeter solar radio waves is described. This equipment has been in continuous use at the National Research Latoratories in Ottawa since 1947. NRCC ERA 216. NRCC 2732.

PHYSICAL REALIZATION OF AN ELECTRONIC COMPUTING INSTRUMENT. SIXTH INTERIM PROGRESS REPORT, by Charles V. L. Smith. Princeton University. Institute for Advanced Study. Sep 1951. 126p drawings, diagrs (part fold in pocket) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 107112

1. Computers, Electronic - Design.

Final report under Contract W-36-034-ORD-7481 and interim report under Contract DA-36-034-ORD-19 on work to Jan 1, 1951.

SEDIMENTATION PROCEDURES FOR DETERMINING PARTICLE SIZE DISTRIBUTION, by Herbert E. Schweyer. Florida Engineering and Industrial Experiment Station, Gainesville, Fla. Jun 1952. 23p photo, drawings, graphs, tables Available from Florida Engineering and Industrial Experiment Station, Gainesville, Fla. PB 107087

The three methods presented are refinements or modifications of procedures originally developed for a specific product. The hydrometer method for clays as standardized by the ASTM is not suited for other minerals, but the modified form as given may be used for any particulate solid that may be dispersed in a proper settling medium. The modifications permit the turbidimeter to be used down to 1.25 microns on either aqueous or nonaqueous suspensions. The multiple tube pipette method presented provides a simple, inexpensive, rapid procedure for precise measurement in the size range covered and is a modification of the original single tube pipette of Andreasen. The detailed procedures for these three methods are complete and can be employed readily by any technician with normal manual dexterity. Engineering progress at the University of Florida, vol. VI, no. 6. F EES 54.

BESCHREIBUNG FÜR DEN SONNENKOMPASS. BAUMUSTER: SOKO (STEHEND) (DESCRIPTION OF THE SUNCOMPASS MODEL SOKO (STATIONARY)). n.d. 10p photos, diagr (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 40059

1. Compasses, Solar - Germany.

STUDIES, INVESTIGATIONS, AND APPLIED RESEARCH CONCERNING RADIO INTERFERENCE INSTRUMENTATION, DEVELOPMENT OF PICK-UP DEVICES, AND EVALUATION OF ELECTRO-MEDICAL EQUIPMENTS. INTERIM REPORT NO. 11, APR 1 TO APR 30, 1952, UNDER CONTRACT NO. NOBSR-52386, INDEX NO. NE-120803, by Richard B. Schulz. Electro-Search, Philadelphia, Pa. Jun 1952. 10p diagr Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107114

1. Diathermy apparatus 2. Electro-medical apparatus 3. Instruments, Measuring - Radio interference

THEORETICAL AND EXPERIMENTAL STUDY OF VORTEX TUBES, by Harry Dornbrand. U. S. Air Materiel Command. Engineering Division. Equipment Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1950. 139p photos, fold. drawings, diagrs, graphs (1 fold) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.50, Photostat $17.50. PB 106997

Experimental data showing the effect of the many parameters governing the performance of a Vortex Tube are presented. The geometrical proportions and arrangement of the various Vortex Tube components for optimum performance are given. In addition to this performance type data, detailed temperature, pressure and velocity profiles at various sections and photographs of the Vortex pattern are presented. Also, a mathematical development and solution are given for the case of laminar motion of a compressible viscous fluid between rotating cylinders with radial flow which are theoretically applicable to a two dimensional Vortex Tube. Lastly, an illustrative problem on the design of a Vortex Tube is presented. Republic Aviation Corporation Contract no. AF 33(038) 5770. Contents: Appendix I. Laminar motion of a compressible viscous fluid between rotating cylinders with radial flow. - Appendix II. Development and application of two dimensional theories. - Appendix III. Development of Knoernschild method and comparison with test data. AAF TR 6123.

Machinery

CAVITATION DUE TO FACTORS IN A SLIT. TRANSLATED BY ROSE JERMAIN, EDITED BY MARGARET W. RAVEN, by K. K. Shalnev. Nov 1951. 61p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 106239

1. Cavitation - Russia 2. Pumps, Hydraulic - Corrosion - Russia 3. Turbines, Hydraulic - Corrosion - Russia 4. NAVSHIPS T443 5. STS 121.

From Engineering magazine, vol. 8, 1950, p. 3-34. Some photographs will not reproduce well.

I.C.E. INSTRUCTION AND PARTS BOOKS. FAIRBANKS: MORSE STATIONARY DIESEL ENGINES MODEL 35 F 10 S; MARINE DIESEL ENGINES MODEL 35 F 10 M. U. S. Bureau of Ships. 1940. 111f drawings Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.75, Enlargement Print $16.25. PB 100236

1. Engines, Internal combustion - Maintenance and repair 2. Engines, Diesel - Maintenance and repair 3. Engines, Diesel - Marine - Maintenance and repair 4. Engines, Internal combustion - Parts 5. Engines, Diesel - Parts 6. Engines, Diesel - Marine - Parts 7. 35F 10S (Engine) 8. 35F 10M (Engine) 9. Micro NAVSHIPS D 6594.

INTERNAL COMBUSTION ENGINES. PART AND INSTRUCTION BOOKS: GENERAL MOTORS MODELS 3-268A, 8-268, 8268A. U. S. Bureau of Ships. Dec 1944. 1014f photos, drawings, diagrs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Enlargement Print $133.75. PB 105312

1. 3-268A (Engine) 2. 8-268 (Engine) 3. 8-268A (Engine) 4. Engines, Internal combustion - Maintenance and repair 5. Engines, Internal combustion - Parts 6. Micro NAVSHIPS D-6003.

THEORY OF SUPERSONIC POTENTIAL FLOW IN TURBOMACHINES, by Robert H. Wasserman. U. S. National Advisory Committee for Aeronautics. Jun 1952. 44p diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106973

A general method for solving supersonic potential flow problems for stationary or rotating coordinate systems is presented. The principal attributes of the method are: It can handle flows which cannot be treated as two-dimensional, and a sound theoretical basis gives assurance of its validity for a class of boundary-value problems. An application to the design of a compressor rotor is made. NACA TN 2705.

Medical Research and Practice

BRIGHT-ADAPTATION DEVICE FOR USE WITH DIFFERENT NIGHT-VISION TESTERS, by H. W. Rose. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 9p photo, graph, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 106892

1. Vision - Dark adaptation - Effect of bright illumination 2. Vision - Dark adaptation - Tests 3. Night vision - Testing equipment 4. AAF SAM Proj. 21-31-003, Report no. 1.

COMPARATIVE EVALUATION OF THE HARDY-RAND-RITTLER POLYCHROMATIC PLATES FOR TESTING COLOR VISION, by Ingeborg Schmidt.

TECHNICAL REPORTS News letter

PUBLISHED MONTHLY

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES
WASHINGTON 25, D. C.

NO. 38, AUGUST 1952

NEW PRODUCT AND NEW PROCESS "DIVIDENDS" FROM DEFENSE RESEARCH

Valuable new developments available to private industry as a by-product of research by Defense Agencies include:

UNIVERSAL, NON CORROSIVE SOLDER, Scientists working for the Army Signal Corps to develop a soldering flux useful on such difficult-to-solder metals as steel, nickel and aluminum, succeeded in finding two paste composition which: 1) could solder the difficult as well as the easy-to-solder metals; 2) were non corrosive; and 3) could be formed into the core of flux-core type solder. Order PB 106 584, Microfilm $2.75, Photostat $7.50.

METAL-TO-CERAMIC BONDING TECHNIQUE. M. I. T. scientists working on a joint Signal Corps-Air Force-Navy project made a series of experiments on the brazing of both metals and nonmetallic materials with active metals such as titanium, ziroconium, columbium and tantalum. These active metals have the interesting property of wetting both metals and nonmetallic materials equally well, producing exceptionally strong bonds which in many cases exceed the strength of the nonmetallic materials. The method has been used in brazing a wide variety of materials, i.e., diamonds, sapphires, carbides, various ceramics, refractory oxides, glass, quartz, stainless steel and chrome-iron-type alloys. Better manufacturing (degassing) techniques for the electronic industries and better cutting tools for metal working shops are envisaged as a result of this method. Order PB 106 109, Price $2.00 in Microfilm, $3.75 in photostat.

BETTER STORAGE OF MOTOR FUELS, Motor fuels exposed to air while in storage tanks pick up a small amount of moisture. When the fuel is cooled this moisture settles out as water droplets which cause corrosion and other troubles in fuel handling and storage. Scientists at the Naval Research Laboratory investigated the problem and issued a report which gives data useful in overcoming the corrosion and other moisture-produced difficulties in fuel handling and storage. Order PB 106 127, Mimeo Price $.50.

MORE EFFECTIVE FIRE EXTINGUISHING FLUIDS: To make hand-portable fire extinguishers safer and more effective, the Army Engineering Corps Research and Development Laboratories developed fire extinguishing fluids which, besides having very efficient extinguishing action, are also non-toxic, non-corrosive, leave no residue, and do not freeze up in cold or evaporate away in warm climates. Order PB 106 268, Microfilm $3.75, Photostat $11.25.

THE NEWSLETTER is a monthly digest of outstanding technical reports available to business firms and laboratories from Federal and other nonconfidential research sources. Special emphasis is placed upon items of interest to smaller business firms. The Newsletter may be purchased as part of the Bibliography of Technical Reports (subscription price, $5 per year) or separately (50c per year).

Published with the approval of the Director of the Bureau of the Budget

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Your U. S. Department of Commerce Field Office can be of assistance to you in placing orders or obtaining technical advice. A list of field office addresses is available from the U. S. Department of Commerce, Washington 25, D. C.

IMPROVED POTATO DEHYDRATING PROCESS. Scientists working for the Army Quartermaster Corps developed a process for treating potatoes prior to dehydration which prevents the product from turning brown in storage. For details of the process order PB 106207, Microfilm $1.25, Photostat $1.25.

PAPER FROM STRAW. As a result of cooperative research by the U. S. Department of Agriculture and the paper and board industries toward better straw-pulping processes, the production of fine paper from straw and the reestablishment of straw as the principal raw material for paper board are imminent. See report (AIC-324) entitled "Recent Advances in Pulping Straw in United States", available from U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Agricultural and Industrial Chemistry, Washington 25, D. C.

BETTER ELECTRICAL WIRING INSTALLATIONS. How heat escapes from electrical cables when packed closely together as in the usual aircraft wiring installations was investigated by scientists of the Naval Research Laboratory. Their report gives pointers on arranging cable bundles for aircraft, ship, and other wiring systems so as to prevent cable overheating. Order PB 106610, Mimeo $.75.

KEY TO BETTER STEEL: Two studies carried out by M. I. T. scientists for Office of Naval Research point the way to elimitating the porosity and brittleness produced in steel by hydrogen. One study developed an analytical technique that presents an accurate picture of the hydrogen content in liquid steel. The other investigated the effects of different hydrogen contents on the mechanical properties of steel and how they are brought about. Order PB 105103, The Analysis and Sampling of Liquid Steel for Hydrogen, sells for $4.25 in microfilm and $12.50 in photostat form. PB 105290, Hydrogen Embrittlement of SAE 1020 Steel, sells for $3.75 in photostat and $2.00 in microfilm form.

TRUE-COLOR SUNGLASSES: How to make sun glasses that are free of color distortion and which give adequate protection against glare from artic snow or bright tropical sun is described in an Air Force report. Testing, inspection and packaging instructions are included. Order PB 106283, Microfilm $2.25, Photostat $5.00.

HOW TO ORDER AN O. T. S. REPORT

1. "PB" reports available from the Office of Technical Services are marked "mimeo" (mimeographed). Address Office of Technical Services, Department of Commerce, Washington 25, D.C. Enclose check or money order payable to the Treasurer of the United States.
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3. For materials available without charge: Address the Newsletter, Office of Technical Services, Department of Commerce, Washington 25, D. C., and give the circled code number—For example (A8)
4. Reports available from other sources—write to the Organization indicated, not to O. T. S.

ALWAYS INCLUDE THE "PB" NUMBER IF GIVEN

The report cannot be identified without it

HIGH VOLTAGE DRY-DISC RECTIFIERS: Smaller size and other advantages in dry disc rectifiers would be realized if discs that could withstand more than 26 volts, now standard, could be manufactured. The Signal Corps therefore conducted a research project to develop processes for manufacturing high-voltage rectifier discs suitable for military application. The final report on this project describes the process achieved for mass production of 40- and 60- volt rectifier discs and indicates a technique which makes possible discs of much higher voltage rating. Order PB 106312, price in microfilm $3.50 and in photostat form $10.00.

SHOPMAN'S AIDS

The series of pamphlets on valuable techniques for shopmen, issued heretofore by the Department of Commerce under the title "Defense Production Aids", is being continued by the Small Defense Plant Administration under the new title: "Technical Aids for Small Business." Four new recent additions to this series are:

PROPER ALIGNMENT OF MACHINE TOOLS:
Treats alignment of lathes, planers, shapers and boring mills.

SHARPENING OF DRILLS, LATHE TOOLS AND MILLING CUTTERS:

SHARPENING CERTAIN METAL CUTTING TOOLS USED IN MACHINE SHOPS:
Treats sharpening of: planer and shaper tools, tools for boring mills, taps, dies and chasers and reamers.

CARE AND MAINTENANCE OF BELT, CHAIN AND GEAR DRIVES:

Copies are available free from your local field offices of either the U. S. Department of Commerce or the Small Defense Plant Administration.

PRODUCTIVITY CHECK UP

Reports by visiting British Productivity Teams studying various American industries make valuable guides by which our own plants can check their productivity status. Newly available are reports on the following industries:

COAL: Our coal industry's output increased 9% in 5 years while its labor force dropped 15%. What accounts for this is closely annalysed by the team in a 107-page report which has excellent chapters on: Management, Labor, Production, and Safety. PB 106435, Price $.90.

FERTILIZERS: A book-length report by the visiting British team shows how production in our superphosphate and compound fertilizer industry compares with productivity in Britain's. The factors which cause this productivity difference are closely studied in the particularly good chapters on: Fertilizer Factories, Process Methods, Manufacturing and Handling Equipment, Production, and Labor, PB 106442, Price $.75.

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SHAVING CREAM - BY AEROSOL BOMB: Are you one of the manufacturers who want to join the current procession toward packaging shaving cream in aerosol-bomb type containers which pour out a ready made lather? If so, you'll find valuable information in the item below, from an earlier issue of this NEWSLETTER.

NEW PRODUCTS FROM AEROSOLS

Wartime government research for prompt and effective insect-elimination methods led to the high-pressure aerosol-bomb, a compressed-gas container for producing insecticidal mists. For a list of references to O. T. S. reports on aerosol research, write to the Office of Technical Services.

The government has a 1943 patent on aerosols as well as improvement patents, all of them licensed on a non-exclusive royalty-free basis to qualified manufacturers. For a list of inventions available for license in this field (from government AND private sources) write to the Commissioner of Patents, Register of Patents, Washington 25, D. C.

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U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1952. 14p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107069

The Hardy-Rand-Rittler polychromatic plates, being developed to test color vision, were evaluated in comparison with tests currently used. They proved to be similar to the AOC 19-plate test in screening in that all color defectives and also a number of normals failed. In quantitative classification of red-green deficiency, the results agree fairly well with those of the Nagel anomaloscope, and more nearly with those of the SAM CTT. The qualitative classification of protans was absolutely correct and that of deutans fairly reliable in comparison with the Nagel anomaloscope. Some recommendations are made to improve administration and printing of H-R.R. charts. AAF SAM Project no. 21-31-013.

DETERMINATION OF PHYSIOLOGICAL CEILINGS FOR HIGH ALTITUDE AIRCRAFT, by A. U. Houle. Canada. Royal Canadian Air Force. Central Experimental and Proving Establishment, Rockcliffe, Canada. May 1952. 8p graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 106987

1. Airplanes - Cabins - Pressure distribution - Canada 2. Aircraft, High altitude - Pressure distribution - Canada 3. Airplanes, High altitude - Pressure - Distribution - Canada 4. Altitude, High - Physiological effects - Canada 5. F-86 (Airplane) 6. Vampire (Airplane) 7. Canopies, Engine - Aerodynamics - Canada.

DN 17-51 (CEPE). AMTS Directive 17-51.

EFFECTS OF MENTAL HYGIENE FILMS ON SELF-REGARDING ATTITUDES (RAPID MASS LEARNING) by Marjorie S. Mertens. Pennsylvania State College, State College, Pa. Jul 1951. 14p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111009

1. Motion pictures, Educational 2. Psychology, Applied 3. Mental physiology and hygiene 4. SDC TR 269-7-22.

Contract N6onr-269, T. O. VII, Project NR-781-005. SDC Human Engineering project 20-E-4.

ELECTRIC STIMULATION OF THE HEART, by J. A. Hopps. National Research Council of Canada. Radio and Electrical Engineering Division. May 1952. 18p photo, drawing, diagr, graphs, tables Available from National Research Council of Canada, Ottawa, Canada. $.25. PB 107041

The principle of electric stimulation of the sino-auricular node of the heart is stated, with a brief outline of the theory of cardiac activity. Three models of the heart stimulator and various electrode assemblies are described. Procedure for stimulation is given. Circuit diagrams and a detail drawing of the electrode assembly are provided. NRCC ERB-266. NRCC 2721.

FURTHER STUDIES ON THE PATHOGENESIS OF COLD-INDUCED MUSCLE NECROSIS, by R. B. Lewis, and P. W. Moen. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. May 1952. 15p photos Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 106891

Three distinct anatomical lesions can be produced in muscle by exposure to cold. These represent different degrees of cold injury and, in the order of decreasing severity, are: (1) coagulation necrosis, (2) slow necrosis, and (3) atrophy. Identical lesions can be produced by controlled heat injury and by ischemia produced by occlusive tourniquets. Ischemia, however, takes a much longer time than does frostbite or heat in producing the same changes. In the cases of heat- or cold-induced injuries the three lesions occupy three parallel zones which are layered from the cutaneous surface of the muscle in the order of decreasing severity. This would indicate that both heat and cold act directly on tissue cells, producing true thermal injuries. AAF SAM Proj. 21-23-006, Report no. 13.

MUSCLE TEMPERATURES IN RABBIT LEGS DURING VARIOUS CONDITIONS OF COLD EXPOSURE AND REWARMING, by R. B. Lewis, and Ella Freytag. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 20p diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $2.50. PB 107089

Continuous temperature measurements were made in several muscle areas of rabbit legs during various conditions of cold exposure and rewarming. Rewarming was accomplished either in air at room temperature, by immersion in warm water, or by diathermy. The rate and extent of cooling were greatest in the tibialis anticus, next greatest in the flexor digitorum longus, and least in the gastrocnemius. In the sequence of increasing cold injury the various muscles develop necrosis in this same order. Of the three rewarming methods used, immersion in warm water was the most effective in raising the muscle temperatures. Diathermy was less effective, but superior to rewarming in air. AAF SAM Proj. 21-23-006, Report no. 12.

NEW TESTS FOR THE EXAMINATION AND TRAINING OF COLOR VISION. III: COLOR VISION MULTITESTER (SIGNAL LAMP) FOR AVIATION, by Ingeborg Schmidt. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1952. 17p diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107068

The Color Vision Multitester for Aviation is a transportable instrument which tests five applicants simultaneously, presenting to each of them a separate test of three signals. On the basis of calculations, these lights correspond to airfield signals in size, brightness, color saturation, composition, and background. The drum of the Multitester rotates automatically, serially presenting eleven sets of three signals and one set with a cross to mark the position. The exposure time and interexposure periods are fixed. AAF SAM Project no. 21-29-006. Report no. 3.

STUDIES ON CUTANEOUS HEAT LOSSES. PART II: REGIONAL RATES OF EVAPORATION FROM THE SKIN AT VARIOUS ENVIRONMENTAL TEMPERATURES, by Alrick B. Hertzman, Walter C. Randall, Clarenee N. Peiss, Russell Seckendorf. U. S. Air Force. Wright Air Development Center. Research Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1951. 18p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D.C. Microfilm $1.75, Photostat $2.50. PB 106958

The rates of evaporation of water from the skin of the face, hand, foot, arm, leg and truck were separately measured by the desiccating capsule technique, in resting nude subjects who were exposed to environmental temperatures in the range of 24° to 38°C. At temperatures below the sweating thresholds, insensible perspiration proceeded at a fairly uniform rate (6-10 gm/M^2/hr) from the skin of the arm, leg and trunk. Palmar, plantar, and facial rates were higher (up to 110 gm/M^2/hr for the palm). The onset of sweating occurred in the various skin regions at different environmental temperature, thus implying a recruitment of sweating which ascended from the distal portion of the extremities to the higher levels of the body as the evaporative demands increased. The possible mechanisms of this phenomenon are discussed. The regional fractions of the total cutaneous evaporation demonstrated domination of evaporative regulation by the legs at temperatures slightly above the sweating thresholds. At temperatures above 34°C., increases in sweating were linear with the rise in temperature and about equal over the body surface. The continued domination of evaporative heat losses by the leg and trunk resulted from the mass effect of their extensive surfaces. Contract AF33 (038)-8585 with St. Louis University. For Pt. I see PB 106376; for Pt. III see PB 106959. AAF TR 6680, Part 2.

STUDIES ON CUTANEOUS HEAT LOSSES. PART III: DERMATOMAL RECRUITMENT OF SWEATING IN RESPONSE TO GENERALIZED RADIANT HEATING, by Walter C. Randall and Alrick B. Hertzman. U. S. Air Force. Wright Air Development Center. Research Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1951. 21p drawing, graphs, table Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 106959

1. Body, Human - Heat loss 2. Evaporation, Cutaneous 3. Skin - Temperature - Measurement 4. AAF TR 6680, Part 3.

Contract no. AF33(038)-8585 with St. Louis University. For Pt. I see PB 106376; for Pt II see PB 106958.

Metals and Metal Products

BIBLIOGRAPHICAL SURVEY OF GERMAN AND JAPANESE EXPERIENCE IN THE EXTRACTION OF LOW-GRADE NON-FERROUS ORES AND THE RECOVERY OF NON-FERROUS METALS AND COMPOUNDS. Gt. Brit. Dept. of Scientific and Industrial Research. Technical Information and Documents Unit, London, England. 1952. 108p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 106944

1. Metals - Recovery - Bibliography 2. Light metals - Recovery - Bibliography 3. Metals, Nonferrour - Recovery - Bibliography 4. Metals, Rare - Recovery - Bibliography 5. DSIR RMS-3.

Report no. RMS-3. S. O. Code no. 47-170.

DIE GESCHWINDIGKEIT DER EINWIRKUNG VON SAUERSTOFF, SCHWEFELWASSERSTOFF, UND HALOGENEN AUF METALLE (VELOCITY OF ACTION OF OXYGEN, HYDROGEN SULFIDE, AND HALOGENS ON METALS), by Gustav Tammann and Werner Köster. Jun 1952. 21p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107002

This report discusses a method of determining the rate of surface oxidation of a metal by the change in the color of the surface film produced by reactions with oxygen, chlorine, or iodine. The metals studied included iron, nickel, copper, zinc, cadmium, tin, lead, cobalt, and manganese. Tables are given for surface film thickness versus color for various times. Zeitschrift für anorganische und allgemeine Chemie, v. 123, August 1922, p. 196-201 and 208-224.

EFFECT OF OPEN CIRCULAR HOLES ON TENSILE STRENGTH AND ELONGATION OF SHEET SPECIMENS OF A MAGNESIUM ALLOY, by R. S. Barker. U. S. National Advisory Committee for Aeronautics. Jun 1952. 24p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107013

The effect of open circular holes on the tensile strength and elongation of sheet specimens of magnesium alloy AM-C52S in both the annealed and the hard-rolled condition was investigated. Tests were made to study the effect of variable ratio of hole diameter to total specimen width and also the effect of spacing and arrangement of the holes. It was found that greater reductions in strength were exhibited by the annealed material but that the hard-rolled material showed the greater reductions in elongation. NACA TN 2716.

EFFECT OF RAPID CHANGES IN TEMPERATURE UPON THE FATIGUE STRENGTH OF A LIGHT ALLOY USED IN AIRCRAFT CONSTRUCTION, by Robert Stanton Turner. Jun 1950. 40p photos, diagr, graph Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107101

An investigation was made to determine the effect of rapidly changing temperatures on 24S-T aluminum sheet undergoing bending stresses in fatigue while the temperature was varied Fatigue tests were run at constant room temperature, a constant temperature of approximately -60°F, and tests with the temperature varying between room temperature and -60°F. The results showed an increased resistance to fatigue under a constant low-temperature condition. The appearance of the fracture of the specimens tested under changing temperature is of a different character than the appearance of the fracture of specimens tested at room temperature. Thesis-Rensselaer Polytechnic Institute.

HIGH FREQUENCY HEATING AND TEMPERATURE DISTRIBUTION IN SURFACE HARDENING OF STEEL, by Ludwig Arthur Dreyfus. Royal Swedish Academy of Engineering Sciences. 1952. 115p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.75, Photostat $15.00. PB 107109

A general survey of surface hardening methods and problems is followed by discussions of eddy currents in ferro magnetic conductors having a redhot non-magnetic outer zone enveloping a magnetic core at lower temperature, surface heating of pieces of great specific thickness (heat flow in one dimension), and surface heating of pieces of small specific thickness. Received by the Royal Swedish Academy of Engineering Sciences Mar 1948. Royal Swedish Academy of Engineering Sciences. Handlingar no. 208.

INFLUENCE OF STRUCTURE ON PROPERTIES OF SINTERED CHROMIUM CARBIDE, by H. J. Hamjian and W. G. Lidman. U. S. National Advisory Committee for Aeronautics. Jun 1952. 21p photos, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107055

An investigation was conducted to study the influence of structural variations on the properties of chromium carbide sintered under pressure. The results show that the room-temperature strength and hardness are influenced by the stages of sintering, which are defined by grain size and by the number, size, location, and shape of pores. The extent to which sintering has progressed during the second stage when densification occurs and the sintering conditions which will yield optimum room-temperature strength can be determined from hardness. It was found that coarse-grained structures are detrimental to room temperature strength. On the basis of limited data, coarse grained structures may not be detrimental at elevated temperatures. NACA TN 2731.

INVESTIGATION OF STATISTICAL NATURE OF FATIGUE PROPERTIES, by E. Epremian and R. F. Mehl. U. S. National Advisory Committee for Aeronautics. Jun 1952. 121p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D.C. PB 107065

Extensive fatigue tests were made on annealed Armco iron and plain carbon and alloy steels heat-treated to different strengths and microstructures. Statistics of fatigue-fracture curves and endurance limits were determined from the experimental data obtained and, for various other materials, from a survey of literature. The results were analyzed to show the relative effects of various metallurgical factors on the statistical nature of fatigue properties. Other phases of the problem studied include: dependence of statistical variation in fatigue life on stress level in the fracture range, statistics for location of crack initiation, size effect, understressing effect, and the form and method of plotting the S-N diagram. NACA TN 2719.

MIGRATION OF COBALT DURING FIRING OF GROUND-COAT ENAMELS ON IRON, by William N. Harrison, Joseph C. Richmond, Joseph W. Pitts and Stanley G. Benner. U. S. National Advisory Committee for Aeronautics. Jun 1952. 28p photos, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107012

A typical porcelain-enamel ground coat containing a small amount of radioactive cobalt as oxide was prepared, applied to sandblasted enameling-iron blanks, and fired under conditions selected to give underfired, normally fired, and overfired coatings. Examination of these specimens revealed that a cobalt-bearing metallic deposit had been formed at the enamel-metal interface during firing, and that the enamel layer was depleted in cobalt oxide near the interface. The amounts of such deposit and depletion were found to vary directly with the severity of the firing treatment. The amount of metallic deposit was extremely small, on the order of 0.01 micron thick if computed as a continuous layer of metallic cobalt in the case of the normally fired specimens. NACA TN 2695.

TENSILE STRENGTH OF FERRITE AT HIGH TEMPERATURE, by Joseph L. Van Ullen. Jun 1950. 47p photos, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107100

Some requirements of ferritic steels for high-temperature applications were reviewed to gain insight concerning the problem of developing improved materials. The study is a part of a general program aimed at increasing the high-temperature strength of ferritic steels and understanding the role of alloying elements used in present day steels. The effect of microstructure on high-temperature properties was investigated and, incident to a general evaluation of ferritic steels, a controlled tensile test at 1400°F was developed as an estimated equivalent of 100,000 hr rupture strength at 1000°F. Tensile tests at from room temperature to 1400°F were conducted on a series of binary ferrites containing chromium, molybdenum, boron, vanadium, and titanium. Each of these elements enhances the elevated-temperature tensile strength. A 5% Mo ferrite had a 1400°F tensile strength of 17,000 psi, which is higher than that of many commercial high-temperature steels. Thesis-Rensselaer Polytechnic Institute.

Meteorology and Climatology

UPPER ATMOSPHERE RESEARCH, REPORT NO. I, COMPILED AND EDITED BY M. A. GARSTENS, H. E. Newell, Jr., and J. W. Sirey. U. S. Naval Research Laboratory. Oct 1946. 208p photos, diagrs, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $7.50, Photostat $26.25. PB 107014

1. Atmosphere, Upper-Research 2. V-2 (Rocket) 3. Rockets, Controlled 4. Cosmic radiation 5. Spectroscopy, Solar 6. NRL R 2955.

Contents: General introduction, by E. H. Krause. - General description of the V-2 and the field program of the Army Ordnance Dept., by C. H. Smith. - Equipment developed and provided by the Naval Research Laboratory for general use in the V-2 firings: A. The workhead, by J. T. Mengel. - B. Emer-

gency cutoff system, by W. V. Foley and H. C. Hanks. - C. Telemetering from the V-2, by V. L. Heeren, C. H. Hoeppner, J. R. Kauke, S. W. Lichtman, and P. R. Shifflett. - Upper atmosphere research conducted by the Naval Research Laboratory: A. The cosmic ray experiment, by H. E. Newell, Jr. and G. J. Perlow. - B. Electronics of the cosmic ray experiment, by B. Howland, C. A. Schroeder, and J.D. Shipman. - C. Letter to Physical Review on cosmic radiation above 40 miles, by S. E. Golian, E. H. Krause, and G. J. Perlow. - D. Temperature measurements in the V-2, by R. J. Havens and H. E. LaGow. - E. Pressure measurements in the V-2, by N. R. Best, D. I. Gale and R. J. Haven. - F. Theoretical discussion of the inosphere experiment, by J. C. Seddon and J. W. Siry. - G. Development of equipment and techniques for inosphere experiment, by J. F. Clark, C. Y. Johnson, T. M. Moore, and J. C. Seddon. - H. Solar spectroscopy from the V-2, by W. A. Baum, M. L. Greenough, F. S. Johnson, J. J. Oberly, C. V. Strain and R. Tousey. - I. Ejection and recovery of instruments, by T. A. Bergstralh, M. W. Rosen, E. D. Schreiner, and C. H. Smith. - J. Biological experiments in the V-2.

UPPER ATMOSPHERE RESEARCH. REPORT NO. II, COMPILED AND EDITED by H. E. Newell, Jr. and J. W. Siry. U. S. Naval Research Laboratory. Dec 1946. 163p photos, drawings, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.25, Photostat $21.25. PB 107039

The discussions are primarily concerned with the second cycle of V-2 firings; but some of the articles have as their subject general considerations applying to the Rocket-Sonde Program as a whole. A review of the second cycle of V-2 firings, is provided. The installations for flight, and the improvements incorporated into the telemetering system, are described in detail. The results obtained in solar spectroscopy and in the pressure-temperature and cosmic ray experiments, are given. The cosmic ray auxiliary systems and the ionosphere, biological and recovery experiments are discussed. Contents: Second cycle of V-2 firings, by H. E. Newell, Jr. - Installations for the October 10 firing: A. General description of installations in the V-2, by J. T. Mengel. - Program timer, by C. C. Rockwood. - Telemetering from the V-2, by C. H. Hoeppner, J. R. Kauke, R. E. Taylor, and K. M. Uglow. - Upper atmosphere experiments conducted in the V-2: A. Solar spectroscopy, by F. S. Johnson, J. J. Oberly, C. V. Strain and R. Tousey. - B. Pressure and temperature measurements at high altitudes, by N. R. Best. E. Durand and R. J. Havens. - C. The cosmic ray experiment, by S. E. Golian, E. H. Krause and G. J. Perlow. - D. Cosmic ray auxiliary electronics and recorder, by B. Howland and M. L. Kuder, - E. Inosphere experiment, by J. F. Clark, T. M. Moore and J. C. Seddon. - F. Ejection and recovery of instruments, by T. A. Bergstralh, M. W. Rosen and C. H. Smith. - G. Biological experiments, by T. M. Moore. - Theoretical discussions: A. Determination of ambient temperatures and pressures in the atmosphere from pressure measurements made at various points on the surface of a rocket, by M. A. Garstens. - B. Geometric factors underlying coincidence counting with Geiger counters, by Homer E. Newell, Jr. and Eleanor Pressly. - Future research by E. H. Krause. - Appendix: Table of critical values. NRL R 3030.

UPPER ATMOSPHERE RESEARCH, REPORT NO. III, COMPILED AND EDITED by H. E. Newell, Jr. and J. W. Siry. U. S. Naval Research Laboratory. Apr 1947. 67p photos, tables, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 106998

"The report consists of a series of articles by various authors on the first year of research in the upper atmosphere". Contents: I. The accomplishments of the first year of rocket-sonde research in the upper atmosphere, by E. H. Krause. - II. Objectives, accomplishments and proposed immediate and long range plans in the basic research program. A. Astrophysics and atmospheric composition, by E. Durand and R. Tousey. B. Cosmic rays, by E. H. Krause and G. J. Perlow. C. The ionosphere, by T. R. Burnight and J. C. Seddon. D. The physical characteristics of the atmosphere, by N. R. Best and R. J. Havens. - III. Progress and proposed developments in the supporting program. A. The V-2 research warhead, by T. A. Bergstralh. B. Telemetering from rockets, by C. H. Smith, Jr. C. Radio control, by J. T. Mengel. - App. I. V-2 firing schedule. - App. II. Reports and publications by NRL personnel on upper atmosphere research. - App. III. Talks by NRL personnel on upper atmosphere research. NRL R 3120.

UPPER ATMOSPHERE RESEARCH, REPORT NO. IV, COMPILED AND EDITED by H. E.Newell, Jr. and J. W. Siry. U. S. Naval Research Laboratory. Oct 1947. 179p photos, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.25, Photostat $22.50. PB 106999

Report gives results and methods associated with NRL V-2 flights in the third and fourth cycles. Results in cosmic ray research, high altitude spectroscopy, investigation of ionosphere, atmospheric pressure and temperature studies are given. Photography at very high altitudes is discussed and photographs of the earth taken from altitudes in excess of 100 miles are included. NRL R 3171.

UPPER ATMOSPHERE RESEARCH WITH V-2 ROCKETS, by Homer E. Newell, Jr. U. S. Naval Research Laboratory. Jun 1948. 21p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107000

1. Atmosphere, Upper - Research 2. V-2 (Rocket) 3. Rockets, Controlled 4. NRL R3294.

Minerals and Mineral Products

COLOURED TREATMENTS FOR BITUMINOUS SURFACES. DISCOLOURATION OF WINDOW GLASS. ADDITION OF GYPSUM PLASTER TO MORTARS AND RENDERINGS. Gt. Brit. Dept. of Scientific and Industrial Research. Building Research Station,

Watford, England. Jun 1952. 4p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.10. PB 107086

1. Bituminous materials - Coloring - Gt. Brit. 2. Glass - Deterioration - Gt. Brit. 3. Gypsum - Effect on mortar - Gt. Brit. 4. Mortar (Building material) - Gypsum - Gt. Brit. 5. DSIR BRD 43. S. O. Code. no. 72-22-0-43.

MILITARY ENGINEERING, VOL. XIV: CONCRETE, PART I: PRACTICE. Gt. Brit. War Office. Jan 1952. 212p photos, diagrs, drawings, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.90. PB 107084

1. Concrete - Manufacture - Gt. Brit. 2. Concrete - Mix proportions - Gt. Brit. 3. Concrete - Physical properties - Gt. Brit. 4. Concrete - Research - Gt. Brit. 5. Engineering, Military - Gt. Brit.

WO Code no. 8626. This part supersedes Military Engineering Volume XIV, part I, 1944. (Code no. 7523). 26/GS Trg Publications/1914. S. O. Code no. 57-59-14-1.

STABLE CONCRETE MIXES, by Sven G. Bergström. Svenska Forskningsinstitutet för Cement och Betong, Stockholm. 1951. 34p photos, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107093

Various methods of stabilizing concrete mixes are discussed in this report, and are illustrated by examples derived from practical applications. It is pointed out that additions of resins cause an increase in deformability, the composition of the mix being equal in other respects, produces stabilization, and improves the workability. This is also demonstrated by examples and photographs and graphs. Svenska. Forskningsinstitutet för Cement och Betong, Stockholm. Meddelanden nr. 24.

Photographic and Optical Goods

VORLÄUFIGE BESCHREIBUNG UND BEDIENUNGSANWEISUNG FÜR DIE HANDKAMMER 12.5 CM. 7X9 IN KASTEN (HK. 12.5/7X9) FL 38004. (PRELIMINARY DESCRIPTION AND DIRECTIONS FOR USE OF THE AERIAL CAMERA 12.5CM. 7X9 IN CASE (HK.12.5/7X9) FL 38004. Germany. Reichsluftfahrtministerium. n.d. 20p (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 40067

1. Cameras, Aerial - Germany 2. Fl 38004 (Camera).

Physics

General

ATMOSPHERIC PHYSICS AND SOUND PROPAGATION. PROGRESS REPORT NO. 18 ON CONTRACT W-36-039-SC-32001 FOR QUARTER ENDING JULY 20, 1947, SUBMITTED by Harold K. Schilling. Pennsylvania State College. Dept. of Physics. Acoustics Laboratory, State College, Pa. Aug 1947. 52p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107048

Contract with Signal Corps Engineering Laboratories, Bradley Beach, N. J. For progress reports no. 19, and 25 see PB 107040 and PB 107050. For final report Sep 1950 see PB 107051.

ATMOSPHERIC PHYSICS AND SOUND PROPAGATION. PROGRESS REPORT NO. 19 ON CONTRACT W-36-039-SC-32001, FOR QUARTER ENDING OCTOBER 20, 1947, SUBMITTED by Harold K. Schilling. Pennsylvania State College. Dept. of Physics. Acoustics Laboratory, State College, Pa. Nov 1947. 59p photos, drawings, diagrs, graphs tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107049

Contract with Signal Corps Engineering Laboratories, Bradley Beach, N. J. For progress reports no. 18, and 25 see PB 107048 and PB 107050. For Final report Sep 1950 see PB 107051.

ATMOSPHERIC PHYSICS AND SOUND PROPAGATION. PROGRESS REPORT NO. 25 ON CONTRACT W-36-039-SC-32001, FOR QUARTER ENDING APRIL 20, 1949, SUBMITTED by Harold K. Schilling. Pennsylvania State College. Dept. of Physics. Acoustics Laboratory, State College, Pa. May 1949. 46p photos, drawing, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107050

Department of the Army Project: 3-99-04-022. Signal Corps Project: 192B-O. Contract with Signal Corps Engineering Laboratories, Bradley Beach, N.J. For progress reports no. 18, and 19 see PB 107048 and PB 107049. For Final report Sep 1950 see PB 107051.

ATMOSPHERIC PHYSICS AND SOUND PROPAGATION: FINAL REPORT ON CONTRACT W-36-039-SC-32001, FOR PERIOD OF JULY 1, 1945 TO MAY 20, 1950, SUBMITTED BY THE STAFF OF THE ACOUSTICS LABORATORY, DEPARTMENT OF PHYSICS, THE PENNSYLVANIA STATE COLLEGE, STATE COLLEGE, PENNSYLVANIA. Pennsylvania State College. Dept. of Physics. Acoustics Laboratory, State College, Pa. Sep 1950. 375p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $9.00, Photostat $37.50. PB 107051

This report is more than a compilation of the progress reports. It is organized according to subject matter rather than chronologically; it contains some new material and a good deal of analysis and discussion not included in the progress reports; and it attempts to present an over-all picture of the work accomplished on each phase of the project. A table of contents, acknowledgments, a list of progress reports, a list of publications, an historical introduction, and a summary precede the body of the report. The body of the report consists of eleven chapters and five appendices. Dr. Harold K. Schilling served as the

director of this project from its inception to its conclusion. This final report waa organized and prepared under the direction of Dr. R. Simon and was compiled and edited by Dr. H. D. Rix. Department of the Army Project 3-99-04-022. Signal Corps Project 192B-O. For Progress reports no. 18, 19, and 25 see PB 107048-107050.

BERICHT UEBER DIE ARBEITSTAGUNG, SCHALLAUSBREITUNG IN WASSER, IN RANKENHEIM AM 20 UND 21 MAI 1943 VERANSTALTET VON DER AMTSGRUPPE MAR RÜST/FEP (REPORT ON THE SOUND-PROPAGATION-IN-WATER CONFERENCE AT RANKENHEIM, MAY 20 AND 21, 1943). Howey and others. May 1943. 75p drawings, graphs (Text in German) Available from I ibrary of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.50, Photostat $10.00. PB 40062

1. Sound, Underwater - Propagation - Germany.

Nuclear

DECAY OF RADIOACTIVE MIXTURES, by Hugh R. Lehman and Robert H. Lynch. U. S. Chemical Corps. Chemical and Radiological I aboratories. Radiological Division, Army Chemical Center, Md. Apr 1952. 16p graph Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107007

Equations predicting the time of maximum fractional activity for a nuclide of a radioactive mixture have been derived. In the case of a mixture of fission products, most activities will "peak" at approximately 1.7 half-lives from the time of fission. Project 4-12-10-002. Interim report. CC CRL IR 115.

Structural Engineering

FATIGUE AND STATIC TESTS OF FLUSH-RIVETED JOINTS, by Darnley M. Howard and Frank C. Smith. U. S. National Advisory Committee for Aeronautics. Jun 1952. 39p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106992

Fatigue and static tests were made of 1/8-inch diameter A17S-T3 100° countersunk-head rivets in lap and butt joints. Both machine-countersunk and dimpled holes were used. The sheet materials were 0.032-inch-thick bare and alclad 24S-T3 and 75S-T6 aluminum alloys and 0.064-inch-thick alclad 75S-T6 alloy. From the results no satisfactory single relation between static properties and fatigue life covering the four materials could be found. NACA TN 2709.

FROST ACTION IN SOILS, A SYMPOSIUM PRESENTED AT THE 30TH ANNUAL MEETING, JAN 9-12, 1951. Highway Research Board. 1952. 396p photos, drawings, diagrs, graphs, tables Available from Highway Research Board, National Research Council, 2101 Constitution Ave., N. W., Washington, D. C. $3.75. PB 106960

1. Frost damage 2. Permafrost 3. Roads - Surface treatment - Frost damage 4. Airports - Pavements - Frost damage 5. Soils - Freezing effects 6. Soils - Moisture content 7. Soils - Temperature 8. Soils - Thermal properties 9. HRB SR2 10. NRC 213.

National Research Council Publication 213. Contents: Foreword, by K. B. Woods. - Major soil profiles and their relationship with climate, by A. C. Orvedal, J. Kubota and H. M. Smith. - Climate aspects of frost heave and related ground frost phenomena, by P. A. Siple. - Soil temperature, a review of the literature, by C. B. Crawford. - Field measurements of soil temperature in Indiana, by E. J. Yoder and C. R. I owrie. - Absolute method of determining thermal conductivity and diffusivity of soils, by A. D. Misener. - Thermal conductivity probe, by F. C. Hooper. - Discussion of soil temperature, by H. H. Miller. - Methods for measuring the moisture content of soils under field conditions, by G. J. Bouyoucos. - Measurement of soil moisture and temperature by soil moisture and temperature by heat-diffusion moisture cell, by W. M. Aldous and W. L. Lawton. - Measurement of soil moisture and density by neutron and gamma-ray scattering, by D. J. Belcher. - Water in highway subgrades and foundations, by F. N. Hveem. - Soil moisture under concrete pavement of an airport, by T. B. Riise. - Distribution of capillary moisture at equilibrium in stratified soil, by M. C. Spangler and Wei Te Pien. - Moisture conditions under flexible airfield pavements, by J. F. Redus and C. R. Foster. - Heat transfer and temperature distribution in soils for transient heat flow due to cylindrical sources and sinks, by Y. S. Touloukian, J. D. Bottorf and Thor Harsen. - Thermal properties of soils, by Miles S. Kersten. - Relation of frost action to the clay mineral composition of soil materials, by R. E. Grim. - Theory of ice-blocked drainage as a principal factor in frost heave, slump, and solifluction, by P. A. Siple. - Soil instability on slopes in regions of perennially frozen ground, by R. S. Sigafoos and D. M. Hopkins. - Calculation of depth of thaw in frozen ground, by Harry Carlson. - Interpretation of permafrost features from airphotographs, by R. E. Frost. - Cold room studies of frost action in soils, by J. F. Haley and C. W. Kaplar. - Nature and extent of damage to New Hampshire highways from frost action, by P. S. Otis. - Frost action and spring breakup in Colorado, by R. E. Livingston. - Frost action in Michigan, by O. L. Stokstad. - Frost damage to roads in Great Britain, by D. Croney. - Load-carrying capacity of roads affected by frost action, by T. B. Lawrence. - Frost-action studies of thirty soils in New Jersey, by F. C. Rogers and H. C. Nikola. - Investigation of the effect of frost action on pavement supporting capacity, by K. A. Linnell and J. F. Haley. - Calcium chloride treatment of frost action, by H. R. Smith. - Controlling the effects of frost action in Michigan, by O. L. Stokstad. - Remedies and treatments for the frost problems in Nebraska, by O. L. Lund. - Remedies and treatments by the Connecticut Highway Dept., by Philip Keene. - Influence of frost on highway foundations, by E. I. Fuller. - Norwegian State Railways' measures against frost heaving, by Sv. Skaven-Hang. - Results of a questionnaire on remedies and treatments, by T. E. Shelburne. - Results of a questionnaire on needed research, by Frank Olmstead. - Needed research pertaining to frost action and related phenomena, by A. W. Johnson. - Discussion on the frost symposium, by Miles S. Kersten.

LABORATORY DESIGN FOR HANDLING RADIOACTIVE MATERIALS. RESEARCH CORRELATION CONFERENCE SPONSORED BY THE AMERICAN INSTITUTE OF ARCHITECTS AND THE ATOMIC ENERGY COMMISSION, NOV 27 AND 28, 1951, CONDUCTED BY THE BUILDING RESEARCH ADVISORY BOARD. Building Research Advisory Board. May 1952. 145p photos, drawings, diagrs, graphs, tables Available from Building Research Advisory Board, National Research Council, 2101 Constitution Ave., N. W., Washington, D. C. $4.50. PB 106943

1. Radiochemical laboratories - Design 2. Radiochemical laboratories - Design - Bibliography 3. Radioactivity - Protection 4. Radioactive materials - Handling 5. Waste, Radioactive - Disposal 6. Nuclear physics - Glossaries 7. BRAB CR 3.

Contents: Introductory remarks, by Walter A. Taylor. - Introduction to subject of conference, by Sumner T. Pike. - Architectural Introduction to radiochemical-laboratory layout, by A. D. Mackintosh. - Air supply and exhaust in laboratories handling radioactive materials, by Carlton P. Roberts. - Control and shielding of isotopes in radioactive laboratories, by Nelson B. Garden. - Surfaces and finishes for radioactive laboratories, by James G. Terrill. - Disposal of radioactive wastes, by E. C. Pitzer. - Summaries of the conference. - Glossary of terms used in nuclear science and technology. - Bibliography (TID-3013) - Attendance list.

LOADS ON REINFORCED CONCRETE FLOOR SLABS AND THEIR DEFORMATIONS DURING CONSTRUCTION. FIANL REPORT, by Knud E. C. Nielsen. Svenska Forskningsinstitutet för Cement och Betong, Stockholm. 1952. 116p photos, drawings, graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.75, Photostat $15.00. PB 107094

This report based on field studies dealing with the load distribution between floor slabs and the formwork, was made possible by the Swedish State Committee for Building Research. Diagrams, graphs and photographs. Svenska Forskningsinstitutet för Cement och Betong, Stockholm. Handlingar no. 15.

STUDY OF CONSERVATION IN BUILDING CONSTRUCTION, PERFORMED UNDER CONTRACT DPA-3 BETWEEN THE DEFENSE PRODUCTION ADMINISTRATION AND THE NATIONAL ACADEMY OF SCIENCES. FINAL REPORT. Building Research Advisory Board. Jun 1952. 246p tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $3.50. PB 111006

Discloses numerous conservation measures which should make significant savings in materials and cost. Report is divided into two major parts - Part 1, recommendations by BRAB, and Part 2, reports of the Advisory panels. A summary of all recommendations is provided at the beginning of the report. The appendix lists the names of all advisors who aided BRAB and furnishes data on existing government practices and standards. BRAB's recommendations deal with the basic principles of conservation and propose a program for the federal construction agencies.

ON A THEORY OF SANDWICH CONSTRUCTION, BY W. S. HEMP. COMMUNICATED by E. F. Relf. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Mar 1948. 9p diagrs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 107063

The theory of sandwich construction developed in this paper proceeds from the simple assumption that the filling has only transverse direct and shear stiffnesses, corresponding to its functional requirements. This supposition permits integration of the equilibrium equations for the filling. The resulting integrals, are used to study supposition permits integration of the equilibrium equations for the filling. The resulting integrals are used to study the compression buckling of a flat sandwich plate. The formulae obtained are complex, but may be simplified in practical cases. A second approach to sandwich problems is made in section 5 where a theory of 'bending' is outlined. This generalises the usual theory, making allowance for flexibility in shear. This approach is applied to overall compression buckling of a plate, and agreement with the previous calculations is found. This suggests the possibility of calculating buckling loads for curved sandwich shells. A simple example, the symmetrical buckling of a circular cylinder in compression is worked out. The theory developed would seem applicable to all cases of buckling of not too short a wave length. Cover date is 1952. S. O. Code no. 23-2672. ARC RM 2672.

Textiles and Textile Products

CORRUGATED FIBROUS WEBS AS INSULATION FILLERS, by E. R. Frederick. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. Mar 1952. 21p photos, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.75. PB 111003

Described in this report is the development of a laboratory method for achieving increase in compressional resilience of bulk fibrous materials by reorienting the fibrous mass from a predominantly horizontal to a vertical configuration. This is achieved by bending or buckling the fibrous mass so that the plane of the fibers lies perpendicular to the plane of the batting itself. Laboratory tests have demonstrated the superiority of this type of "corrugated batting." QMC TSR 70.

FUNDAMENTAL STUDIES OF CHEMICAL RETARDANTS FOR THE FIRE RESISTANT TREATMENT OF TEXTILES, by James M. Church. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. 1952. 308p photos, drawings, graphs, tables Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $7.75. PB 111007

This report describes in detail some fundamental studies on the thermal decomposition of both treated and untreated cotton fabrics, including identification and analysis of the char, tar, and volatile products formed in this decomposition. The rates of fabric degradation are also discussed together with the effect of certain flame-retardant compounds in reducing these rates. Some data are presented to show the degree of protection to incident heat or flame provi-

ded by flameproofed fabrics, and also to show how their protection value is reduced when quantities of the retardant are removed by wetting or laundering. The oxidation of carbon as related to the afterglow phenomenon is considered. Chemical and physical properties of flameproofing agents are described, and fundamental discussions of the principles on which the different fire retardant systems (e.g., foam type, urea-phosphate, antimony oxide organic chloride combinations) operate are given together with exploratory investigations of specific flameproofing agents and methods of treatment. QMC TSR 38.

Transportation Equipment

Aeronautics

Aircraft

C-118A AIRPLANE ENGINEERING INSPECTION, by Charles Castellano. U. S. Air Materiel Command. Engineering Division. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1951. 3p Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 102976

1. Airplanes - Inspection 2. C-118A (Airplane) 3. Douglas Aircraft Company, Inc., Santa Monica, Cal. 4. AAF TSEAA MR S2-2.

ANALYSIS OF SUPERSONIC FLOW IN THE REGION OF THE LEADING EDGE OF CURVED AIRFOILS, INCLUDING CHARTS FOR DETERMINING SURFACE-PRESSURE GRADIENT AND SHOCK-WAVE CURVATURE, by Samuel Kraus. U. S. National Advisory Committee for Aeronautics. Jun 1952. 45p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107066

Flow in the region of the leading edge of curved airfoils with attached shock waves is investigated. Tables and charts are presented for determining the surface-pressure gradient and shock-wave curvature in supersonic flow of an ideal diatomic gas. The results cover a range of Mach numbers from 1.5 to infinite and deflection angles from zero up to those approaching shock detachment. Calculations of surface-pressure gradient and shock-wave curvature are also made for curved airfoils in supersonic flow of a calorically imperfect, diatomic gas. An approximate procedure for determining the flow field a short distance downstream of the leading edge is also presented. NACA TN 2729.

CALCULATION OF LIFT AND PITCHING MOMENTS DUE TO ANGLE OF ATTACK AND STEADY PITCHING VELOCITY AT SUPERSONIC SPEEDS FOR THIN SWEPTBACK TAPERED WINGS WITH STREAMWISE TIPS AND SUPERSONIC LEADING AND TRAILING EDGES, by John C. Martin, Kenneth Margolis and Isabella Jeffreys. U. S. National Advisory Committee for Aeronautics. Jun 1952. 116p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107052

On the basis of linearized supersonic-flow theory formulas for the stability derivatives C_{m_α}, C_{L_q}, and C_{m_q} were derived for a series of thin sweptback tapered wings with streamwise tips and supersonic leading and trailing edges. The results of the analysis are presented as a series of design charts. Some illustrative variations of the derivatives and of the chordwise center-of-pressure location with the various wing design parameters are also included. NACA TN 2699.

CHOKING OF A SUBSONIC INDUCTION TUNNEL BY THE FLOW FROM AN INDUCTION NOZZLES, by W. F. Lindsey. U. S. National Advisory Committee for Aeronautics. Jul 1952. 20p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107140

A decrease in Mach number with increase in induction jet pressure has been shown experimentally, for one type of induction tunnel, to be associated with choking of the induced flow. The analysis of the flow conditions provides a means of predicting the occurrence of induction choking so that it can be adequately considered in design. NACA TN 2730.

LATERAL RESPONSE THEORY, BY K. MITCHELL, WITH APPENDICES by E. M. Frayn. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Mar 1944. 57p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $3.40. PB 107122

A method is given, whereby the calculation of response to any forces whatever is made to depend upon the prior determination of a number of constants, for which the name "model response coefficients" is proposed. The idea of the method is introduced by solving first by the method of variation of constants; later the relevant formulae are more simply obtained by operational methods. It is shown that the Laplace transformation scores over Heaviside's methods in leading at once to a result of considerable generality and in a form more convenient for computation. Methods for calculating model response coefficients and response curves are examined in Appendices, recommended methods being presented as routine computations to be carried out on printed computing sheets "Optimum-interval" tables of certain functions occurring in the calculation of response curves are also given. Cover date is 1952. S. O. Code no. 23-2297. Contents: Appendix A: Calculation of model response coefficients in the normal case. - Appendix B: Calculation of response curves from model coefficients. - Appendix C: Simplified method for the calculation of model response coefficients and response curves, by E. M. Frayn. - Appendix D: Simplification of lateral response calculations, when the product of inertia is not negligible, by the use of modified derivatives, by E. M. Frayn. - Appendix E: Notation. ARC RM 2297.

LEHRBUCH FÜR BODENGERÄTE (ENTWURF) (TEXTBOOK OF GROUND EQUIPMENT (DRAFT

COPY)). Höhere Fliegertechnische Schule. Jun 1942. 121p drawings, diagrs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 40056

1. Engines, Aircraft - Maintenance and repair - Germany.

NORMAL ACCELERATIONS AND OPERATING CONDITIONS ENCOUNTERED BY A HELICOPTER IN AIRMAIL OPERATIONS, by Almer D. Crim and Marlin E. Hazen. U. S. National Advisory Committee for Aeronautics. Jun 1952. 17p photos, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107054

An analysis is presented of the normal accelerations and operating conditions encountered by a single-rotor helicopter engaged in air-mail operation in the vicinity of Los Angeles and its suburbs. NACA TN 2714.

PREVENTION OF BINARY FLUTTER BY ARTIFICIAL DAMPING, by R. A. Frazer. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Feb 1944. 16p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 107061

Formulae are obtained which provide an estimate of the amount of artificial control needed to prevent binary flutter. Results are expressed in terms of a 'minimum damping multiplier' R, defined as the ratio of the least direct damping coefficient required for absolute flutter prevention to the 'natural' direct aerodynamic damping coefficient of the control surface concerned. Numerical results are obtained for five different types of aircraft. Contents: Appendix: Proofs of the formulae. Cover date is 1951. S. O. Code no. 23-2552. ARC RM 2552.

REVIEW OF THE ESSENTIALS OF IMPACT FORCE THEORIES FOR SEAPLANES AND SUGGESTIONS FOR APPROXIMATE DESIGN FORMULAE, by R. J. Monaghan. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Nov 1947. 29p diagrs, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.60. PB 106848

1. Seaplanes - Design - Gt. Brit. 2. Seaplanes - Hulls - Impact pressures - Gt. Brit. 3. ARC RM 2720.

Cover date is 1952. S. O. Code no. 23-2720.

SIMPLIFIED THEORY OF SWEPT WING DEFORMATION, by A. H. Hall. Canada. National Aeronautical Establishment. Jun 1952. 45p photos, diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107103

A simplified theory is presented for determination of displacements along the locus of section shear centres within the root triangle of a swept wing, and formulae are derived which permit straight-forward calculation of the outboard influence coefficients for any loading condition. The theory is developed on the premise that in any mode of deformation, the effect of alteration in the direction of principal strains can be represented by a complementary shearing action along the locus of section shear centres, and that the distribution of this shearing action can be approximated by a simple polynomial with constant coefficients to be evaluated by the principle of least work. NAEC LR-28.

SINGLE-DEGREE-OF-FREEDOM-FLUTTER CALCULATIONS FOR A WING IN SUBSONIC POTENTIAL FLOW AND COMPARISON WITH AN EXPERIMENT, by Harry L. Runyan. U. S. National Advisory Committee for Aeronautics. Jul 1951. 27p Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 104339

A study of single-degree-of-freedom pitching oscillations of a wing has been presented. This study includes the effects of Mach number and structural damping and is primarily an extension of a recent paper by Smilg in which incompressible flow was considered. The actual existence of single-degree-of-freedom flutter was demonstrated by some low-speed tests of a wing, pivoted a short distance ahead of the leading edge with a geometric aspect ratio of 5.87. In general, good agreement was found between experimental and calculated results for high values of an inertia parameter corresponding to high altitudes, but differences exist for low values of the inertia parameter. The effect of aspect ratio has not been considered in the calculations and could have an appreciable influence on the oscillation. NACA TN 2396.

TANK TESTS ON A HULL WITH THE MAIN STEP FAIRED IN PLANFORM AND ELEVATION, by D.I.T.P. Llewelyn-Davies. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1945. 36p photos, drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.15. PB 107064

1. Planing surfaces - Hydrodynamics - Gt. Brit. 2. Seaplanes - Hulls - Planing surfaces - Gt. Brit. 3. Seaplanes - Tanks - Aerodynamic pressure - Gt. Brit. 4. Fairings, Surfaces - Airplane - Gt. Brit. 5. Seaplanes - Hulls - Surface fairings - Gt. Brit. 6. ARC RM 2708.

Cover date is 1952. S. O. Code no. 23-2708.

THEORETICAL ANALYSIS OF HYDRODYNAMIC IMPACT OF A PRISMATIC FLOAT HAVING FREEDOM IN TRIM, by Robert W. Miller. U. S. National Advisory Committee for Aeronautics. Jun 1952. 31p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724, "F" St., N. W., Washington 25, D. C. PB 107072

The paper presents the derivation and a method for solution of equations taking into account the effects of freedom in trim on the loads, moments, and motions of a prismatic, V-bottom float forebody during hydrodynamic impact. Comparisons of solutions of the equations with fixed-trim solutions and with some experimental data are presented and indicate that the solutions are reasonable and consistent with both the experimental data and with general experience. Appendix A: Method of solution. - Appendix B: Reduction to fixed-trim case. NACA TN 2698.

UNIVERSITY OF MICHIGAN LIBRARIES

THEORETICAL INVESTIGATION OF THE RESPONSE OF A HIGH-SPEED AEROPLANE TO THE APPLICATION OF AILERONS AND RUDDERS, by K. Mitchell, A. W. Thorpe and E. M. Frayn. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1945. 92p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $5.75. PB 107059

The response of a fast moving aeroplane to a lateral gust, and to applied rolling and yawing moments, is examined by means of the differential analyser, taking a range of values of the principal lateral stability parameters, and including sufficient ranges of the other stability and inertia parameters to make the conclusions of general validity for high-speed flight. A general survey is made of the dependence of the motion upon the various parameters, the differential analyser results being supplemented by the use of approximate formulae, which were developed with a view to this application. Particular attention is paid to the amplitudes of the motion in roll, yaw, and sideslip, and it is seen that it may be difficult to make the motion less unpleasant. Contents: Part I. Preliminary. Part II. Response to a sharp-edged side-gust. - Part III. Response to rolling and yawing moments. - Part IV. General conclusions. - Appendix I. Approximations to the lateral stability roots. - Appendix II. The norm for aileron response. - Appendix III. List of symbols. Cover date is 1952. S. O. Code no. 23-2294. ARC RM 2294.

TRANSONIC SIMILARITY RULES FOR LIFTING WINGS, by Keith C. Harder. U. S. National Advisory Committee for Aeronautics. Jun 1952. 26p diagr Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107074

Transonic similarity rules for lifting wings at small angles of attack are derived. These rules make it possible to present each aerodynamic coefficient for a family of wings of varying aspect ratio and thickness ratio in a single design chart for the transonic range. Appendix A: Some remarks concerning the application of transonic similarity rules to lifting wings. - Appendix B: Derivation of transonic approximation for Prandtl-Meyer flow. NACA TN 2724.

TUNNEL BLOCKAGE NEAR THE CHOKING CONDITION, by A. Thom and Myra Jones. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Aug 1946. 16p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.15. PB 107123

By a consideration of mass flow, blockage corrections are estimated up to the choking speed of the tunnel, and a curve is given showing the blockage for a Rankine oval in terms of the uncorrected choking Mach number. The theory of the method of determining blockage from wall pressures is examined more critically for the two-dimensional cases and extended to certain three-dimensional cases. Cover date is 1952. S. O. Code no. 23-2385. Appendix: Evaluation of the incremental velocity due to a finite wing and its images. ARC RM 2385.

VERLÄUFIGE RICHTLINIEN FÜR DIE AUSFÄHRUNG UND AUSWERTUNG VON FUNKEIGENPEILUNGEN IM FLUGZEUG (PRELIMINARY INSTRUCTIONS FOR WORKING OUT AND USE OF LOOP NAVIGATION IN AIRCRAFT). n.d. 21p diagrs, graph Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 40058

1. Navigation, Aerial - Training - Germany. Supplement to "Der beobachter-dienst" t. III; Navigation.

WINGS OF FINITE ASPECT RATIO AT SUPERSONIC VELOCITIES, by D. R. Taunt and G. N. Ward. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Jan 1946. 12p diagrs, graph Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 107124

An error in the well-known work by Schlichting is corrected, and it is shown that the integral equation derived can be solved analytically. The main result of the paper is that, for a plane rectangular wing of aspect ratio A, the lift coefficient is less than that for an infinite plane wing by a factor

$$1 - \frac{1}{2A\sqrt{(M^2 - 1)}},$$

where M is the Mach number of the undisturbed stream. It is shown that the analytical solution can be extended to plane wings of trapezoidal shape of any cutting-off angle. Cover date is 1952. S. O. Code no. 23-2421. ARC RM 2421.

ZIRKEL ZUR MESSUNG VON FLUGZEUGGESCHWINDIGKEITEN. BESCHREIBUNG UND BEDIENUNG (COMPASS FOR MEASUREMENT OF AIRPLANE SPEED. DESCRIPTION AND USE), by Gebr Wichmann Jan 1943. 11p (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 40057

1. Airplanes - Speed - Measurements - Germany 2. Compasses, Aircraft - Germany.

Instruments

FLOW IN AN AXIALLY-SYMMETRIC SUPERSONIC JET FROM A NEARLY-SONIC ORFICE INTO A VACUUM, by P. L. Owen and C. K. Thornhill. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Sep 1948. 8p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107062

1. Jets, Air - Supersonic - Flow - Gt. Brit. 2. Mach number - Effect - Gt. Brit. 3. Interferometers - Gt. Brit. 4. Flow, Supersonic - Theory - Gt. Brit. 5. Parabolic arcs - Tables - Gt. Brit. 6. Mathematics, Applied - Aerodynamics - Gt. Brit. 7. ARC RM 2616.

Cover date is 1952. S. O. Code no. 23-2616.

INITIAL RESULTS OF INSTRUMENT-FLYING TRIALS CONDUCTED IN A SINGLE-ROTOR HELICOPTER, by Almer D. Crim, John P. Reeder and James B. Whitten. U. S. National Advisory Committee for Aeronautics. Jun 1952. 16p photos, diagrs, graphs

Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107024

Instrument-flying trials have been conducted in a single-rotor helicopter to determine the adequacy of existing longitudinal flying-qualities requirements under instrument conditions. In addition, lateral-directional characteristics were examined. The suitability, for helicopter use, of standard airplane instruments was also investigated. NACA TN 2721.

Engines and Propellers

EFFECT OF CHANGING PASSAGE CONFIGURATION ON INTERNAL-FLOW CHARACTERISTICS OF A 48-INCH CENTRIFUGAL COMPRESSOR. I: CHANGE IN BLADE SHAPE, by Donald J. Michel, John Mizisin and Vasily D. Prian. U. S. National Advisory Committee for Aeronautics. May 1952. 40p photo, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106948

The passage contour of a 48-inch centrifugal impeller was modified by changing the shape of the blades. A comparison of the internal-flow characteristics was made of the original and modified passage contours at the design flow rate. In addition, the internal-flow characteristics of the modified passage are presented and analyzed over the entire flow range from maximum flow to surge at a corrected impeller tip speed of 700 feet per second. NACA TN 2706.

EFFECT OF COMPRESSOR-OUTLET AIR BLEED ON PERFORMANCE OF A CENTRIFUGAL-FLOW TURBOJET ENGINE WITH A CONSTANT-AREA JET NOZZLES, by Sidney C. Huntley. U. S. National Advisory Committee for Aeronautics. Jun 1952. 20p graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107005

The effect of compressor-outlet air bleed on the performance of a centrifugal-flow turbojet engine is presented. The cost of compressor-outlet air bleed in terms of the increase in net-thrust specific fuel consumption was about 2 percent for each percent of air bleed for constant engine speed, maximum net thrust, or constant net-thrust operation. When maximum net-thrust operation with air bleed occurred at a constant tail-pipe temperature, the maximum net thrust decreased at a rate of about 2.5 percent for each percent of air bleed, while the loss in net thrust with air bleed at constant engine speed was only about 0.5 percent for each percent of air bleed. NACA TN 2713.

ENTWURF EINER BETRIEBS-UND WARTUNGS-VORSCHRIFT. HM 508 D-1 (OPERATING AND MAINTENANCE INSTRUCTIONS FOR HM 508 D-1). Ger. Reichsminister der Luftfahrt und Oberbefehlshaber der Luftwaffe. Apr 1939. 61p photos, drawings, fold diagr, graphs, tables (Text in German) Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 40049

1. Germany. Oberbefehlshaber der Luftwaffe 2. Engines, Aircraft - Operation - Germany 3. Engines, Aircraft - Maintenance and repair - Germany 4. HM 508 D-1 (Engine). L. Dv. 864/1.

ESTENSIONE AI CASI DI SIMMETRIA CENTRALE BI-E TRI-DIMENSIONALE DI DUE PARTICOLARI SOLUZIONI DELLE EQUAZIONI DEL MOTO GASSOSO NON PERMANENTE (EXTENSION TO THE CASES OF TWO DIMENSIONAL AND SPHERICALLY SYMMETRIC FLOWS OF TWO PARTICULAR SOLUTIONS TO THE EQUATIONS OF MOTION GOVERNING UNSTEADY FLOW IN A GAS), by Lorenzo Poggi. Jun 1952. 6p Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107009

The author previously discovered two interesting particular solutions to the equations of motion describing unsteady flow in a gas confined solely to a one-dimensional duct. These solutions are now extended to cover the more noteworthy cases of central symmetry in two and three dimensional. Translated by L. H. Cramer of Cornell Aeronautical Laboratory, Inc. Original Italian report appeared as Estensione ai casi di simmetria centrale bi-e tri-dimensionale di due particolari soluzioni delle equazioni del moto gassoso non permanente, in the anniversary volume entitled Numero Speciale in Onore di Modesto Panetti, published by L'Aerotecnica, Associazione Tecnica Automobile, and La Termotecnica, Turin, Italy, 25 November 1950. NACA TM 1332.

METHOD AND GRAPHS FOR THE EVALUATION OF AIR-INDUCTION SYSTEMS, by George B. Brajnikoff. U. S. National Advisory Committee for Aeronautics. Apr 1952. 40p diagrs, graphs (1 fold) tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106937

Graphs that allow rapid evaluation of air-induction systems from considerations of their aerodynamic parameters in combination with power-plant characteristics are presented for the supersonic Mach numbers up to 3.0. Restrictions imposed by the engine characteristics on the use of a fixed-size air inlet are discussed and illustrated by means of sample solutions. The relation between the engine characteristics, flight conditions, inlet characteristics, and inlet area for optimum performance is given. NACA TN 2697.

METHOD FOR CALCULATION OF HEAT TRANSFER IN LAMINAR REGION OF AIR FLOW AROUND CYLINDERS OF ARBITRARY CROSS SECTION (INCLUDING LARGE TEMPERATURE DIFFERENCES AND TRANSPIRATION COOLING), by E. R. G. Eckert and John N. B. Livingood. U. S. National Advisory Committee for Aeronautics. Jun 1952. 71p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107108

A method which permits approximation of local heat-transfer coefficients in the laminar-flow region around cylinders of arbitrary cross section from those for wedge-type profiles is extended to include the effects of large temperature differences and transpiration cooling. Charts prepared from exact

solutions of the laminar boundary-layer equations for wedge-type profiles which allow for these effects yield results with a minimum of calculation. Application of the method to circular and elliptic transpiration-cooled cylinders is made to determine local heat-transfer coefficients and surface temperatures and to determine the variation in coolant flow required for maintaining a constant surface temperature. NACA TN 2733.

SPRAY NOZZLES FOR THE SIMULATION OF CLOUD CONDITIONS IN ICING TESTS OF JET ENGINES, by N. Golitzine, C. R. Sharp. and L. G. Badham. Canada. National Aeronautical Establishment. 1951. 19p photos, drawings, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. Limited supply available from National Aeronautical Establishment, Montreal Roada, Ottawa, Canada. PB 106994

The report describes tests on pneumatic and swirl type spray nozzles for simulating natural cloud conditions in icing tests of jet engines. Figures are given for the water droplet sizes obtainable in sprays from nozzles of different sizes, at various conditions. In the swirl type nozzles tested, there was imparted to the water jet, issuing under pressure, a swirling motion, which caused atomization. It was found that at a given pressure, atomization was finer, the smaller the nozzle, and with a given nozzle atomization became finer with increase in pressure up to about 1000 lb./in., after which pressure had no appreciable effect. The pneumatic type nozzles tested were of simple construction: compressed air expanded through an orifice; water was fed through a tube to the centre of the orifice, and was there atomized by the expanding air. There were no fine passages either in the air or water outlets, hence there was little possibility of obstruction. It was found that, with air pressures above the critical (about 13 lb./in. gauge), when the air reached sonic velocity, droplet size in any one of the pneumatic nozzles tested was primarily dependent on the water to air mass flow ratio. This report was published in August 1950, as report ME-186 of the Division of Mechanical engineering National Research Council. NRCC ME-186. NAEC R 14.

STRAIN GAUGE FLUTTER TESTS ON A 4-BLADE PROPELLER WITH DURALUMIN BLADES, by J. Kettlewell, and H. G. Ewing. Gt. Brit. Ministry of Supply. Aeronautical Research Council. May 1946. 4p diagr, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107125

This note describes tests made on a fluttering Duralumin propeller with strain gauges fitted. Three different blade settings in the stalling region were investigated. The flutter encountered was purely torsional; and the amplitude of strain recorded was at no time serious. Cover date is 1952. S. O. Code no. 23-2471. ARC RM 2471.

THEORETICAL INVESTIGATION OF VELOCITY DIAGRAMS OF A SINGLE-STAGE TURBINE FOR A TURBOJET ENGINE AT MAXIMUM THRUST PER SQUARE FOOT TURBINE FRONTAL AREA, by Leo Cohen. U. S. National Advisory Committee for Aeronautics. Revised. Jun 1952. 34p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107076r

The aerodynamic requirements of a single-stage turbine for a turbojet engine at maximum thrust per square foot turbine frontal area are presented in the form of velocity diagrams. An impulse diagram with supersonic velocities relative to the leading and trailing edges of the rotor is required for practically all blade speeds and turbine-inlet temperatures investigated. Appendix A: Calculation of hub-tip ratios for constant stress. - Appendix B: Calculation of velocity diagrams. - Appendix C: Correction of thrust for turbine efficiency. NACA TN 2732.

TWO-DIMENSIONAL STEADY NONVISCOUS AND VISCOUS COMPRESSIBLE FLOW THROUGH A SYSTEM OF EQUIDISTANT BLADES, by Hans J. Reissner. U. S. National Advisory Committee for Aeronautics. Jun 1952. 48p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107073

The problem of two-dimensional flow of a compressible nonviscous fluid through blade systems of equidistant spacing, of identical shape, and of straight-line arrangement of position is analyzed. Viscous flow through a grid system of equidistant, narrowly spaced blades is treated in an appendix. Appendix: Two-dimensional viscous, laminar steady compressible flow through a system of equidistant narrowly spaced blades. NACA TN 2718.

Maintenance and Repair

ANALYSIS OF MAINTENANCE DUTIES ON JET PROPELLED NAVAL AIRCRAFT, by J. H. Hill, Harry J. Older, Willis C. Schaefer. Institute for Research in Human Relations, Washington, D. C. May 1952. 170p drawing, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $6.25, Photostat $21.25. PB 107147

This report presents information in the following areas: 1. A list of maintenance tasks performed on jet propelled aircraft in fleet operating and service squadrons. 2. A report of the personnel utilization practices presently employed in accomplishing each of the maintenance tasks in a group of fleet operating and service squadrons, including a specification as to rating and pay grade of the men performing the tasks. 3. A recommended system for the assignment of personnel ratings and pay grades to jet propelled aircraft maintenance duties. The system is so constituted as to provide concrete suggestions as to qualifications for advancement in the ratings studied. 4. Recommendations regarding the General Service Rating structure, the Emergency Service Rating structure and the Navy Job Classifications. 5. Implications arising from the study for possible future research and procedures in selection, classification, training, and advancement in rating of enlisted aircraft maintenance personnel. Contract no. N8 onr-69406. Institute report no. 6, series 1952.

EMPIRICAL EVIDENCE ON AIR FORCE CAREER FIELDS, by Robert L. Thorndike and Raymond C. Norris. U. S. Air Training Command. Human Resources Research Center, Lackland Air Force Base, San Antonio, Texas. Mar 1952. 18p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107021

1. Airman classification battery 2. Personnel, Flying - Classification 3. Columbia University. Teachers College 4. AAF HRRC RB 52-13.

Project no. 510-022-0001. Contract no. AF 33(038)-13474. Research Bulletin 52-13.

EFFECT OF MOTIVATION UPON PERIPHERAL PERCEPTION DURING THE PERFORMANCE OF A CENTRAL PSYCHOMOTOR TASK, by Harry P. Bahrick, Robert E. Rankin and Paul M. Fitts. U. S. Air Training Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Apr 1952. 11p drawing, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107043

1. Hands - Coordination 2. Coordination tests 3. Perception - Tests 4. Nerves, Peripheral - Physiology 5. Motor reactions - Measurement 6. Ohio State University, Columbus, Ohio 7. AAF HRRC RB 52-14.

Project no. 509-020-0004. Contract no. AF 33(038)-10528. Research Bulletin 52-14.

FACTOR ANALYSES OF THE ARMY, NAVY AND AIR FORCE CLASSIFICATION BATTERIES, by Virginia Zachert. U. S. Air Training Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Mar 1952. 25p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107020

1. Personnel, Flying - Classification 2. Personnel, Military - Classification 3. Personnel, Naval - Classification 4. AAF HRRC RB 52-12.

Project no. 503-001-0017. Research Bulletin 52-12.

INFLUENCE OF THE TIME INTERVAL AFTER INTERPOLATED ACTIVITY ON PSYCHOMOTOR PERFORMANCE, by Jack A. Adams. U. S. Air Training Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Mar 1952. 12p graph, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107019

Information was sought on the nature of the process that weakens an originally learned response (OL) during the subsequent acquisition of the antagonistic response (IL). It was hypothesized that this reduction in OL response strength results from a process similar to that underlying experimental extinction and that spontaneous recovery of the OL response would occur between the end of IL and the relearning of the original response (RL). A total of 84 subjects performed on a Revised Complex Coordination Test, Model D. Each of four experimental groups had a different time interval between the end of IL and the beginning of RI. These intervals were: 2 minutes, 10 minutes, 30 minutes, and 4 hours. Two control groups were employed to evaluate warm-up effects. A third control group was used to evaluate possible gains attributable to work effects. Project no. 509-020-0006. Contract no. AF 33(038)-13214. Thesis - State University of Iowa. AAF HRRC RB 52-11.

INSTRUCTIONAL SETS AND HABIT INTERFERENCE, by Moncrieff Smith. U. S. Air Training Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Jan 1952. 10p tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107018

Subjects were shown a sequence of 260 letters, one letter at a time, with instructions to respond by pushing a button whenever any one of a set of 8 predesignated letters appeared. After five trials with the same letters the subjects were divided into three groups for transfer tests. Nine subjects were assigned the same letters in a scrabled order ("same" group). Nine more subjects were assigned an entirely new set of 8 letters ("different" group). Eighteen subjects were assigned a set of 4 new and 4 old letters ("half" group). The results showed: 1. Complete positive transfer for the "same" group. 2. No evidence of negative transfer in the "different" group. 3. Evidence of negative transfer in the carry-over of old responses in the "half" group (previously practiced letters not assigned on the transfer trials). 4. No significant evidence for positive transfer in the "half" group on letters previously practiced and still assigned. The results are interpreted as indicating the need for assigning a more important role in theories of transfer to sets induced by instructions. Project 509-020-0001. Research Bulletin 52-3. AAF HRRC RB 52-3.

POST-TRAINING PERFORMANCE OF AVIATION MACHINIST'S MATES, by J. H. Hill, Edward P. Buckley, Harry J. Older. Institute for Research in Human Relations, Washington, D. C. May 1952. 101p drawings, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107038

The purpose of this research was the development of procedures for the evaluation of the post-training performance of men of this rating. The study was conducted in two phases. Phase One was concerned primarily with the development of the AD Job Sample Test. Scores on this measure are derived from careful observation and rating of actual performance of selected maintenance jobs on aircraft. In Phase Two the AD Post-Training Evaluation Test was developed. This is a paper and pencil test which is highly related to the AD Job Sample Test and possesses the advantage over it of ease of administration. The performance evaluation devices developed in this study can serve several important functions in

connection with the aviation rating. Contract N8 onr-69402.

Aerodynamics

APPROXIMATE METHOD OF DETERMINING THE SUBSONIC FLOW IN AN ARBITRARY STREAM FILAMENT OF REVOLUTION CUT BY ARBITRARY TURBOMACHINE BLADES, by Chung-Hua Wu, Curtis A. Brown and Vasily D. Prian. U. S. National Advisory Committee for Aeronautics. Jun 1952. 47p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106991

A method is presented to obtain a relatively quick approximate solution of the detailed subsonic flow of a nonviscous fluid past arbitrary turbomachine blade sections lying on an arbitrary surface of revolution. Calculation is first made for the flow along a particular streamline about midway between two adjacent blades. Extension of the flow from this streamline to the blade surfaces is then made by the use of a Taylor's series, and a method is provided to correct the solution to fit the given blade shape and operating conditions. The method is illustrated with examples of compressible flow in a turbine cascade and a centrifugal compressor. Three terms of the Taylor's series are found to give sufficient accuracy. Sufficient convergence is obtained for the turbine cascade after two cycles of computation and for the centrifugal compressor after four cycles of computation. (Each cycle of computation takes 16 hours). The detailed flow distribution obtained compares very well with an available numerical solution and experimental data. NACA TN 2702.

DIFFUSION OF HEAT FROM A LINE SOURCE IN ISOTROPIC TURBULENCE, by Mahinder S. Uberoi and Stanley Corrsin. U. S. National Advisory Committee for Aeronautics. Jun 1952. 90p photos, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107004

An experimental and analytical study has been made of some features of the turbulent heat diffusion behind a line heated wire stretched perpendicular to a flowing isotropic turbulence. The mean temperature distributions have been measured with systematic variations in wind speed size of turbulence producing grid, and downstream location of heat source. The nature of the temperature fluctuation field has been studied. A comparison of Lagrangian and Eulerian analyses for diffusion in a nondecaying turbulence yields an expression for turbulent-heat-transfer coefficient in terms of turbulence velocity and a Lagrangian "scale". A convenient form has been deduced for the criterion of interchangeability of instantaneous space and time derivatives in a flowing turbulence. NACA TN 2710.

EINFLUSS GROSSER ZÄHIGKEIT BEI DER STRÖMUNG UM DEN ZYLINDER UND UM DIE KUGEL (EFFECT OF HIGH VISCOSITY ON THE FLOW AROUND A CYLINDER AND AROUND A SPHERE), by Fritz Homann. Jun 1952. 29p diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107010

The report records an experimental and theoretical investigation of the influence of high viscosity on the stagnation pressure of flow around cylinders and spheres. For the three-dimensional problem, a differential equation is set up which corresponds to the two-dimensional solution by Heimenz. Theoretical methods are developed for determining the stagnation pressure for the two and the three-dimensional cases of flow around cylinders and spheres, respectively. The results thus obtained are compared with experimental results obtained in an oil channel at Reynolds numbers up to approximately 100. Finally, a procedure to determine the velocity and the pressure variation, as well as the variation of the free-stream velocity gradient on the stagnation streamline, is shown and used for the practical case of Reynolds number 100. Translation from Zeitschrift für angewandte mathematik und mechanik, vol. 16, no. 3, June 1936, p. 153-164. NACA TM 1334.

EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF VISCOSITY ON THE DRAG AND BASE PRESSURE OF BODIES OF REVOLUTION AT A MACH NUMBER OF 1.5, by Dean R. Chapman and Edward W. Perkins. U. S. National Advisory Committee for Aeronautics. 1951. 27p photos, diagrs, graphs, tables Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $.25. PB 106995

Models were tested to evaluate effects of Reynolds number for both laminar and turbulent boundary layers. Principal geometric variables investigated were afterbody shape and length-diameter ratio. Force tests and base-pressure measurements were made. Schlieren photographs were used to analyze the effects of viscosity on flow separation and shock-wave configuration and to verify the condition of the boundary layer as deduced from the force tests. The results are discussed and compared with theoretical calculations. NACA Report 1036.

FLOW CHARACTERISTICS OVER A LIFTING WEDGE OF FINITE ASPECT RATIO WITH ATTACHED AND DETACHED SHOCK WAVES AT A MACH NUMBER OF 1.40, by John H. Hilton, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1952. 21p photos, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F", St., N. W., Washington 25, D. C. PB 107053

A series of schlieren photographs and pressure distributions obtained in the Langley 4- by 4-foot supersonic tunnel are presented to illustrate the general characteristics of supersonic flow over a wedge under conditions of attached and detached shock. The pressure distributions and aerodynamic coefficients are compared with shoch-expansion theory. NACA TN 2712.

INTERACTION OF OBLIQUE SHOCK WAVES WITH REGIONS OF VARIABLE PRESSURE, ENTROPY, AND ENERGY, by W. E. Moeckel. U. S. National Advisory Committee for Aeronautics. Jun 1952. 34p drawings, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107006

Equations are developed for computing the propagation of oblique shock waves through regions in which pressure, energy, or entropy are continuously variable. For the special cases of supersonic shear flow and Prandtl-Meyer flow, charts are given of shock angle as function of Mach number for any initial-strength wave. A sufficient condition for the avoidance of upstream effects due to shock propagation is found. A wave-interaction procedure for determining supersonic portions of the flow downstream of the shock is described, and an approximate method for dealing with imbedded subsonic regions is proposed. NACA TN 2725.

ON THE APPLICATION OF TRANSONIC SIMILIARITY RULES, by John R. Spreiter. U. S. National Advisory Committee for Aeronautics. Jun 1952. 45p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107075

The transonic aerodynamic characteristics of wings of finite span are discussed from the point of view of a unified small perturbation theory for subsonic, transonic, and supersonic flows about thin wings. This approach avoids certain ambiguities which appear if one studies transonic flows by means of equations derived under the more restrictive assumption that the local velocities are everywhere close to sonic velocity. The relation between the two methods of analysis of transonic flow is examined, the similarity rules and known solutions of transonic flow theory are reviewed, and the asymptotic behavior of the lift, drag, and pitching-moment characteristics of wings of large and small aspect ratio is discussed. It is shown that certain methods of data presentation are advantageous for the effective display of these characteristics. Appendix A: Relation between U_0 and a^* statements of the transonic-flow equations. - Appendix B: Derivation of similarity rules. - Appendix C: Shock-wave relations. - Appendix D: Slope of pressure curve at M_0 1. NACA TN 2726.

O POSTUPATELNON DVIZHENII TEL POD SVOBODNOI POVERKHNOST'YU TYAZHELOI ZHIDKOSTI KONECHNOI GLUBINY. (TRANSLATIONAL MOTION OF BODIES UNDER THE FREE SURFACE OF A HEAVY FLUID OF FINITE DEPTH), by M. D. Haskind. Jun 1952. 20p diagr Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107011

The problem of the uniform motion of a solid body under the free surface of a heavy incompressible fluid of finite depth is treated. The problem is a two-dimensional one and is handled completely by the methods of complex function theory. Translation from Prikladnaya Matematika i Mekhanika, vol. IX, no. 1, pp. 67-78. NACA TM 1345.

RELAXATION TIME EFFECTS IN GAS DYNAMICS, by J. C. Gunn. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Apr 1946. 44p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.65. PB 107060

1. Gases - Thermodynamic properties - Gt. Brit. 2. Airfoils - Aerodynamics - Gt. Brit. 3. Shock waves - Gases - Gt. Brit. 4. Dynamics, Gas - Theory - Gt. Brit. 5. Mathematics, Applied - Aerodynamics - Gt. Brit. 6. ARC RM 2338.

Contents: Appendix I. Theory of the approach to equilibrium by the vibrational modes. - Appendix II. Diffuse shock waves. - Appendix III. Theory of flow past an obstacle. Cover date is 1952. S. O. Code no. 23-2338.

TWO-DIMENSIONAL SHEAR FLOW IN A 90° ELBOW, by James J. Kramer and John D. Stanitz. U. S. National Advisory Committee for Aeronautics. Jul 1952. 44p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107141

As part of an approach to a better understanding of the motion of real fluids in flow machinery, two-dimensional, incompressible, nonviscous shear flows in a 90° elbow have been investigated. Solutions are presented for linear and sinusoidal velocity distributions across the inlet of the elbow. The solutions with linear inlet velocity distributions indicate that as the negative vorticity of the flow increased: (1) the static-pressure drop through the elbow decreased, (2) the local deceleration along the outer channel walls increased, and (3) the magnitude of the velocities on the channel walls changed greatly, but the local pressure coefficient rose only gradually and the difference in pressure coefficient at corresponding points on the two walls was practically unchanged. In the case of a sinusoidal inlet velocity distribution, local decelerations occurred on both walls. NACA TN 2736.

USE OF THE BOUNDARY LAYER OF A CONE TO MEASURE SUPERSONIC FLOW INCLINATION, by Franklin K. Moore. U. S. National Advisory Committee for Aeronautics. Jun 1952. 22p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 106993

An instrument is suggested for the measurement of supersonic flow inclination, taking advantage of the effect of angle of attack on the meridional velocity profile of the boundary layer on a cone. This effect of angle of attack may be measured by the difference of total pressure recorded by two probes pointing toward the apex and located in the plane of symmetry of the flow. NACA TN 2723.

VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS, by John C. Martin. U. S. National Advisory Committee for Aeronautics. Jun 1952. 81p drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107022

A vector study of the partial-differential equation of steady linearized supersonic flow is presented. General expressions are derived which relate the velocity potential in the stream to the conditions on the disturbing surfaces. Problems concerning nonplanar systems are investigated, and methods are derived for the solution of some simple problems. The damping in roll is found for rolling tails consisting of four, six, and eight rectangular fins. NACA TN 2641.

Water Supply, Sanitation and Public Health

CHLORINATION OF WATER SUPPLIES IN THE FIELD: REACTIONS BETWEEN AQUEOUS CHLORINE AND AMMONIA. FINAL REPORT UNDER CONTRACT W-44-009-ENG-463, JUL 1, 1947 TO JUN 30, 1950, by J. Carrell Morris and Ira Weil. Harvard University. Dept. of Engineering, Cambridge, Mass. Jun 1950. 137p graphs, tables Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $5.00, Photostat $17.50. PB 107148

An investigation is presented of the chlorination of water supplies in the field and reactions between aqueous chlorine and ammonia. The subjects discussed are problems in disinfection by chlorine, the rate of formation of monochloramine, the ironization constants of monochloramines, rates of formation of dichloramines, the breakpoint reactions, the bactericidal efficiencies of chlorine and chloramines, and dechlorination studies. An appendix gives the rate of reaction of o-tolidine with the chloramines. For field treatment, chloramine formation cannot be avoided in some waters and so a satisfactory dosage must be based upon the efficiency of disinfection by chloramines. The studies on the reactions between chlorine and ammonia, on the properties of the chloramines, and on rate and mechanism of the breakpoint reactions explain many of the phenomena observed in water chlorination and provide a foundation for further understanding of the processes involved in chlorine disinfection.

PROCEEDINGS OF THE FIRST ANNUAL SYMPOSIUM ON WATER RESOURCES OF LOUISIANA AND THEIR UTILIZATION, NOVEMBER 28, 29, 1951, SPONSORED BY THE COLLEGE OF ENGINEERING AND THE GENERAL EXTENSION DIVISION OF LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE. Louisiana. Engineering Experiment Station, Baton Rouge, La. 1952. 63p maps, tables Available from Louisiana Engineering Experiment Station, Louisiana State College, Baton Rouge, La. $.50. PB 106949

1. Water, Ground - Industrial use 2. Water supply systems 3. Water - Pollution 4. Water - Purification 5. Water, Black 6. Water supply - Sanitation 7. Paper industry - Water pollution 8. Waste water - Purification 9. Waste water - Toxicity 10. Trade waste - Purification 11. Oil industries - Water pollution 12. Petroleum industry - Water pollution 13. Sea water - Pollution 14. Plants - Effects of soil pollution 15. Animals - Feeding and nutrition - Effects of soil pollution 16. Stream pollution - Prevention 17. L EES B31.

Engineering Experiment Station Bulletin no. 31. Contents: Industrial use of ground water in Louisiana, by A. N. Turcan, Jr. - Surface water supplies, their use, characteristics, and availability, by F. N. Hansen. - Fundamentals of the Stream Control Commission Program, by John L. Madden. - Clean streams in an industrial South, by Harold R. Murdock. - Water pollution control program under public law 845, by A. H. Wieters. - Pollution control activities of industrial associations, by W. H. Wisely. - Kraft mill waste treatment researcy, by William A. Moggio. - The research of the industrial fellows of the Louisiana Petroleum Refiner's Waste Control Council, by H. J. Bennett. - Studies on blackwater, by W. T. Oglesby. - Attendance list, Water Resources of Louisiana and their Utilization, First Annual Symposium, L. S. U. Campus - Nov 27, 28, 1951.

Micellaneous

MATERIALS HANDLING IN INDUSTRY. REPORT OF AN INVESTIGATION IN THE U. S. A. MADE BY A GROUP APPOINTED BY THE COUNCIL. Anglo-American Council on Productivity. May 1950. 59p photos, drawings, fold. diagrs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.65. PB 106446

1. Material handling 2. Material handling - Equipment.

MIXED BOUNDARY VALUE PROBLEMS IN SOIL MECHANICS, by R. T. Shield. Brown University, Graduate Division of Applied Mathematics, Providence, R. I. Mar 1952. 29p diagrs, graphs Available from Library of Congress, Photoduplication Section, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 106761

The stress-strain law for an ideal soil formulated in a recent paper is applied here to obtain the velocity equation referred to the stress characteristic lines in plane strain problems. Simple velocity fields associated with families of straight characteristic lines are then examined, together with discontinuities in the velocity field. The results are applied to obtain the incipient velocity field for the identation of a semi-infinite mass of material by a flat punch or footing, and to solve the problem of indentation by a lubricated wedge. Contract N7onr-35801, T. O. I, NR-401-032. GDAM A11-71/29.

RECENT ADVANCES IN PULPING STRAW IN THE UNITED STATES, by S. I. Aronovsky. U. S. Northern Regional Research Laboratory, Peoria, Ill. Dec 1951. 13p diagr, tables Available free from U. S. Bureau of Agricultural and Industrial Chemistry, Dept. of Agriculture, Washington 25, D. C. PB 106589

1. Straw pulp - Recovery from agricultural residues 2. Paper pulp - Recovery from agricultural residues 3. AIC 324.

REPORT FOR THE YEAR 1950-1951. Gt. Brit. Dept. of Scientific and Industrial Research. 1952. 271p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.70. PB 107080

1. Scientific research - Gt. Brit. 2. Industrial research - Gt. Brit.

Cmd. 8494.